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Railway Age

WITH WHICH IS INCORPORATED THE RAILWAY REVIEW

FIRST HALF OF 1927—No. 25 NEW YORK—MAY 21, 1927—CHICAGO SEVENTY-SECOND YEAR

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They Save Much More Than They Cost More

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STANDARD SPECIFICATION TIES

Volume 82 **Number 25**

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Railway Age

Vol. 82 May 21, 1927 No. 25

On the Sheffield Branch of the L. & N. near Columbia, Tenn.

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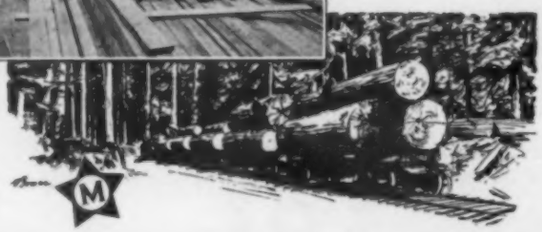
Loading yard stock directly from ship to cars at the Chas. R. McCormick Lumber Co. dock at Wilmington, California



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Douglas Fir • Cedar • Spruce • Hemlock

Railway Age

Vol. 82, No. 25 May 21, 1927

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Traffic from Automotive Industry

THE automotive industry in spite of its instrumentality in the railways' loss of a part of their passenger and freight business, has nevertheless been a large factor in the present railway prosperity. Traffic managers of automotive manufacturers at a recent meeting in Detroit, Mich., announced that the total freight attributable to the automotive industry which was shipped on the railways in 1926 was 3,280,000 carloads. Of this total, 889,778 carloads consisted of motor vehicles and parts. In addition, 910,000 carloads of gasoline, 773,000 carloads of gravel and sand for roads, and many thousands of other commodity shipments due to the automotive industry, including tires, lubricating oil, iron and steel, lumber, asphalt and cement, were transported by the railways. Over and above the total carloadings of automotive products mentioned are those of materials for garages, factories and salesrooms, road building machinery and l.c.l. shipments of parts and accessories, the aggregate volume of which it is impossible to determine. The growth of the automotive industry has been an important cause of the record freight business that the railways have had in recent years.

Psychology and Railroading

"A LOT of the psychology stuff is bunk, but there is so much of a practical nature in it that I'm a believer and confidently expect some developments in the railroad game." Thus writes a young railroad officer who has given considerable study and attention to the selection and training of employees for the mechanical department. The great danger in a new development of this sort—although it is not so very new now—is in rushing to extremes. This may be due to over-enthusiasm in some cases, or, in other instances, to a lack of thorough study and understanding of principles thus far developed and agreed upon. There is much less excuse for this happening today than there was a few years ago, when the science of psychology was little understood, particularly as applied to the industrial field. To a certain extent the mistakes that have been made due to over-enthusiasm have been helpful, for they have made it possible to discover and define certain limitations of the applications of psychology to industry. Some of the foreign concerns, for instance, have discarded the more complicated and extensive psychological tests with which they at first experimented, and are now using a very few simple tests in the effort to match up workers with the tasks for which they are best fitted. This, however, is only one application of the science of psychology to industry. It would appear well worth while for any large organization to study critically and take advantage of those things that are being developed, which will help to secure a better understanding of the handling of the human problem in industry and transportation.

The Freight Agent

THE Freight Station Section of the American Railway Association met in Memphis this week. Its meetings and the activities of freight agents in general have been steadily increasing in scope and importance for some years. The freight agent of today is expected to be something more than a chief clerk and warehouse foreman. He is a very potent factor in public relations work and this is equally as true in the small town as it is in large cities. Efficient freight station operation has been receiving some of the attention it deserves. The building of new and better freight stations has been given careful study in recent years and many improvements in design and layout have come as a result of such study. Freight handling methods also have been made much more efficient by new devices and new methods.

Advertising Passenger Service

A PASSENGER traffic officer of a road which advertises its services extensively relates an incident in connection with one of its campaigns which is interesting and possibly conveys a lesson. This officer received a letter from the president of a large concern saying that he had heard only by word of mouth of a new service which the railroad is offering. A check-up was made and it indicated that this man had received from six to ten letters telling of this new service and that it had been advertised over a period of months in the daily paper of his city. Plainly the most thorough-going advertising campaigns do not reach directly every individual in a community. They do, however, reach a constantly increasing number, and the man in the instance cited who did not learn of the service through the advertising, probably heard of it from a friend (or a friend of a friend) who had been attracted by the advertising. The returns from the dollar spent to advertise a new service do not stop with the publication of an advertisement. The advertising merely starts the ball rolling and, when repeated, gives it a boost now and then. The total returns, indirect as well as direct, can probably never be accurately learned, particularly when the service advertised lives up to the promise or excels it.

Flood Affects Tie Production

AMONG the incidental effects of floods in the lower Mississippi and its tributaries which will eventually accrue to the disadvantage of certain of the railroads, is the curtailment of tie production in Arkansas and Louisiana. As the result of an investigation made by the National Association of Railroad Tie Producers it is evident that operations are at a standstill over large inundated areas, as well as on unsubmerged lands that have

been isolated by the floods, although actual losses of stock appear to be relatively small. To what extent the railroads tributary to these producing areas will suffer by reason of reduced tie supplies will depend in large measure on the success attending efforts of the producers to resume operations. Some delays will result from a water-logged condition of the roads, but the largest factor of uncertainty is the prospective labor supply, which will be determined in large measure by the rapidity with which activities in other lines are restored. But even if the supply of labor proves ample it is estimated that production cannot be undertaken in full force for at least 60 days, while the prospect of a rate of output after that time in sufficient volume to make up fully for the loss of production during the period of suspension is exceedingly remote. It is evident, therefore, that an appreciable readjustment of normal lines of distribution must be made in order that all of the railroads may be assured an adequate supply of crossties.

How Successful Electric Lines Make Their Service Attractive

J. G. HOLTZCLAW of the Eastern Texas Electric Company, in a recent address on the subject of "How far should we go in dressing up street cars?", said that he did not know the answer; no one has yet had sufficient experience to suggest a limitation. He told of a company which experienced a decline in revenues for four years and then began to improve the comfort and appearance of its equipment. This was two years ago; revenues immediately began to increase and have continued to do so. All cars were put through the paint shop and done over inside and out in attractive colors "vastly different from the old standardized yellow and green." New seats were provided and better flooring and illumination installed. Conditions on railroads differ somewhat from those on the electric railways, but the question arises as to whether, in the matter of merchandising their passenger service, the same general rules do not apply. "This," says Mr. Holtzclaw, "is a day of luxury. . . . The working girl who is willing to spend a fourth of her weekly income for silk hose is certainly willing to spend 10 cents to ride in a first-class street car rather than 5 cents to ride in a dirty, rattle-trap piece of equipment on a rough track."

New Highs for Railway Stocks

THE *Railway Age's* average of the prices of 20 representative railroad stocks was shown in last week's issue as 112.50, the highest it has ever reached. It compared with 109.31 for the previous week, thereby showing an increase of 3.19 points. This increase over the previous week is of particular significance in itself because there have been but four occasions since the *Railway Age*, in January, 1921, began the compilations of these averages, that any greater increase has been shown in one week as compared with the week before. In none of these cases was the amount of increase very much greater than in the present case, the greatest increase ever shown in any one week having been last August when the average increased 3.91 points. It is also interesting to compare last week's average of 112.50 with the previous week reached by the *Railway Age* averages. This was 110.91 for the week of April 19, which indicates an increase of 1.59 points over the best previous figure. Furthermore, even as recently as the first week in January, 1927, the average was 102.23 or about 10 points below what it is today. A year ago it was 88.83 or about 23½ points lower. When the *Railway Age* started the compilation of the average price of 20 representative railroad stocks in January, 1921, the first week's figure was 58.39 or only slightly more than one-half the present average.

The present high prices of railway stocks result, first, because the experts in the financial districts consider that the railroad shares are entitled to participate to the fullest extent in the present and now long continued "bull" market. The railroad shares have been further assisted by the favorable earnings statements of many of the leading carriers for the first quarter of 1927. In a previous editorial attention was directed to a sudden decline in the prices of stocks of the railroads most likely to suffer adversely from the floods in the lower Mississippi Valley. It is noteworthy that the prices of the stocks in question have since recovered most of this loss. In other words, the opinion regarding the railroad securities is so favorable that even the possible losses that might be expected to result from flood conditions could not for long depress railroad stock prices. The situation generally with regard to the stock market's attitude toward railway stocks is certainly one permitting no small degree of gratification to the railway manager who is responsible for securing the operating results that make the present high prices of railway shares possible.

The continued prevalence of an extraordinary amount of capital seeking investment and of consequent low interest rates is, however, the principal explanation of the continuance of the "bull" market in railway and many industrial securities.

Is Death at a Crossing So Much Worse?

DURING the first 130 days of 1927, 302 persons were killed in the vicinity of Chicago as a result of street and highway accidents involving motor vehicles, or an average of 16 per week, but except for passing comment in the newspapers little attention is given to this enormous loss of life which goes on steadily day after day, week after week, not only in and around Chicago but in all metropolitan areas of the country. An entirely different attitude is observed with respect to fatal accidents at railway grade crossings. Indignation meetings are held, committees are appointed and editorials are written, all for the purpose of demanding grade separation, in spite of the fact that casualties at grade crossings during 1926 totaled only 9,483 as compared with 621,000 casualties resulting from the operation of highway motor vehicles or a ratio of 1 to 65.

It is true, of course, that the chance of death in an accident occurring at a railway-highway intersection is considerably greater than in an accident occurring on a highway at points away from railway tracks, the ratio of deaths to injuries in grade crossing accidents being 1 to 2.8 as compared with the ratio of 1 to 28.8 in the case of all accidents involving motor vehicles. It is obvious, of course, that an encounter between an automobile and a railway train will unusually result more disastrously than a collision between two highway vehicles or other accidents involving highway vehicles alone; and this in a measure may explain the prevailing attitude of the public in its apparent indifference to the ordinary accidents on the highway, while "viewing with alarm" the increase in accidents at the highway cross-

ings at railroads. However, it is difficult to understand why a total of 9,483 accidents in which the railroads are involved should give rise to demands for wholesale separation of grades, while no one apparently considers that any drastic measures need be taken as a means of effecting any appreciable reduction in the far greater number of casualties on the highways in which the railways are not involved.

Dominance of Radicalism In the Interstate Commission

THE proceeding started in the federal district court at St. Louis to set aside the decision of the Interstate Commerce Commission in the St. Louis & O'Fallon railway valuation case is of the greatest significance because it is the answer of the railways to the most important and probably the most radical decision ever rendered by any government body regarding the regulation of railroads and public utilities.

No doubt it will surprise many persons to be told, in view of the present general conservatism of the federal government regarding business, that the decision in this case has shown that the commission, as at present constituted, has passed under the domination of the radical element in politics for many years led by the late Senator LaFollette. But it is easy to cite an overwhelming array of facts which demonstrate that this is the case. The history of the changes in the views of the commission on railroad valuation closely parallels the history of the changes in the views of the late Senator LaFollette, and it finally has arrived at practically the same destination that he did shortly before his death.

The commission had opportunity to choose whether it would accept one extreme view, that the valuation should be based entirely on what it would cost to reproduce the railways at prevailing wages and prices; or an intermediate view, that it should be based on both the actual cost of construction and the present cost of reproduction, as well as all other pertinent factors; or, finally, another extreme view, viz., that it should be based solely on the number of dollars the railways have cost, less a large deduction for depreciation. It finally adopted the last mentioned basis, which, of all the bases that have been advocated, is the one most adverse to the railways. There is no substantial difference between the basis adopted by the commission and that of so-called "prudent investment" that was advocated by the late Senator LaFollette in the closing years of his life. On the commission's own estimates the cost of reproduction of the part of the properties of the railways which existed before the war would now be, measured in money, about 70 per cent more than it would have been in 1914, and yet, on the basis it has adopted, the valuation placed upon this part of the properties would be less than its actual cost in pre-war money because of the large deduction for depreciation the commission holds should be made.

Significance of the Decision

What this means is that the effect of changes in the value of money upon the incomes of investors in railroads and public utilities should be entirely different from its effects upon the incomes of all other classes of persons. It is plain that if the value of money, the only measure of which is its purchasing power, declines, and the money incomes of any class of persons do not increase, their actual incomes decline in direct proportion to the decline in the value of money. That money incomes should increase at least in proportion to the decline in the value of money is universally conceded as to most classes of investors and wage earners. Throughout industry in this country, including the railroad industry, the bulk of the advances in wages that have been made since before the war have been made to compensate labor for increases in the cost of living, which is merely a phrase used to indicate the decline that has occurred in the purchasing power of each dollar of its wages. The value, measured in money, of most kinds of property in existence before the war has advanced to the level of what it would cost in dollars to create the equivalent of it now.

The widespread complaints of the farmers are inspired by the fact that the value in money of their property and products has not increased in proportion to the decline in the purchasing power of the dollar, and all the remedies, legislative and otherwise, for their condition which they have sought have been intended to put their property and products on a parity in money value with the property and products of most of those from whom they have to make purchases. What the Interstate Commerce Commission holds with respect to the value of railroad property and of the incomes derived by investors from it is that they must decline in proportion as the value of the dollar declines. The dollar is worth perhaps 40 per cent less than before the war. No account whatever of this fact, the commission holds, should be taken in making a valuation of the part of railroad property that existed at that time. The value of the money of some foreign nations declined approximately 100 per cent. There is no escape from the conclusion that, on the commission's reasoning, if the value of the dollar also had declined 100 per cent there should be placed upon the property of the railways that existed before the war no valuation whatever.

Result of Fallacious Reasoning

The way in which this conclusion is reached is singularly illogical. It is pointed out in the majority opinion that the commission never has taken into consideration the decline in the value of money in regulating the net return the railways might earn, and that, nevertheless, the railways have been successful in raising and investing so much capital that they are now able to render good and adequate service. It is found convenient to ignore the fact that this result did not always follow upon the commission's policy. The decline in the value of the dollar as indicated by changes in wages and prices began some years before the war in Europe commenced. In 1911, and for some years subsequently, the commission regulated rates in disregard of this declining value of money, with the result that the investment of capital in the railroads rapidly declined. In consequence, when a large increase in traffic began in the latter part of 1915 and continued for five years, the nation suffered losses of many billions of dollars owing to the inadequacy of railway transportation. That was the direct result of the narrow and restrictive policy which the commission had previously followed, and which its decision in the O'Fallon case shows a majority of its present members believe it should follow in future in an intensified degree.

The investment made since 1920 has been made when railway net return has been increasing and when there has been expectation that in due time the railways would be allowed to earn annually a "fair return" on a valuation based largely on reproduction costs. When the significance of the commission's decision to make no allowance as to property constructed prior to 1914 for the subsequent decline in the value of the dollar becomes generally appreciated it is hardly to be expected there will be so much optimism regarding the future of railway securities.

Important Economic Factors Ignored

The commission made no reference in its opinion to some of the most important factors in the great economic problem with which it is dealing. It is in the interest of the public welfare not only that the railways shall be able to render adequate service, but that they shall be able to render it with the greatest practicable economy. Not only expansion of facilities but many improvements in them which will save labor, fuel and materials always are needed, and for both of these purposes there is required the constant and large investment of new capital. Undue limitation of the return the railways may earn results in undue limitation of the capital they can invest to effect economies, but the commission, throughout its opinion, reasons as if restriction of the net return that may be earned necessarily restricts the cost of transportation to the public.

Having for many years based most of its regulating on the premise that the rates the railways may charge should be determined mainly by the net return they should be allowed to earn, the commission now becomes solicitous lest it shall authorize the railways to earn a return which will result in rates being made higher than the traffic can bear. It even uses the forebearance the railways have shown within recent years in not carrying its rate decisions into court as an evidence that their managers have believed that traffic could not bear higher rates. In what it says it helps to encourage the apprehension of many people that a valuation made in accordance with past decisions of the courts and the provisions of the LaFollette valuation law would result in an enormous advance in rates. There are, in fact, many people not familiar with the subject who believe that an increase in the valuation would cause a directly proportionate advance in rates.

An Erroneous View

This, of course, is an entirely erroneous view. The commission estimates that a valuation based on the cost of reproduction in 1923 would have been about 31 billion dollars. Allowing for the investment made since 1923, an average advance of only about 10 per cent in rates would have been sufficient in 1926 to have enabled the carriers to have earned a return of 5¾ per cent on the commission's own estimate of cost of reproduction. Nobody has ever yet advocated that rates should be made high enough to yield a "fair return" on a valuation based entirely on present cost of reproduction, but actually to have produced such a return would have required a general advance in 1926 that would have been much less than the reductions of rates that the commission has made within the last five years.

As has been clearly pointed out by four dissenting members of the commission, its decision in the O'Fallon case is not only contrary to the law which it is charged with administering, but repudiates what it had repeatedly said previously as to what it intended to do. First, the Supreme court of the United States, in a long line of decisions, has uniformly held that, in making a valuation of railroad or public utility property, the amount that it would cost to construct it at present must be considered. Secondly, the LaFollette law passed in 1913, under which the valuation is being made, specifically requires the commission to ascertain and give weight to present cost of reproduction. Third, the commission has repeatedly said in reports regarding the valuation of many railways that "the estimates of cost of reproduction covered by this report are based upon what is referred to herein as the 1914 level of prices," but that "this discrepancy will be removed when the commission adjusts to later dates, *in accordance with the requirements of the valuation act,* the final value herein reported."

Why Radicalism is Dominant

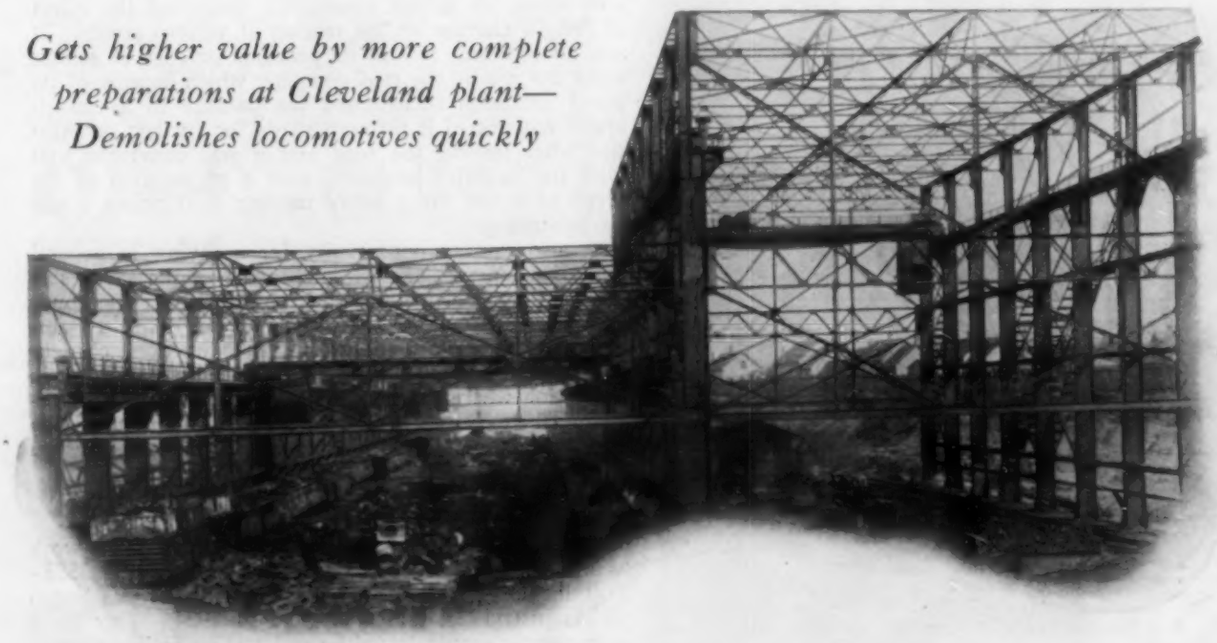
It has become a widely accepted view that the commission is an impartial body that seeks only to administer federal railway laws fairly and in accordance with their plain purpose. The policy adopted by it regarding valuation must, when it becomes understood, disillusion all who have accepted this view. The commission includes men who are conservative, impartial and disposed to carry out the laws, but it also includes men who are well-known to have held radical views and to have been deeply prejudiced against private ownership of railways before they were appointed, and it is now plain that their influence has become predominant. The opinion in the O'Fallon case bears the name of Commissioner Meyer, but the tone and reasoning of the most important parts of it strongly indicate that they were written by Commissioner Eastman, who for years has been an avowed advocate of government ownership.

The reasons for the obvious predominance of radicalism in the commission are apparently threefold. First, every government body tends to assume an attitude of partiality against the concerns it regulates; secondly, some men of very radical views have been appointed to and become highly influential in the commission; and, third, the radicals in Congress, such as Senators Wheeler, Norris and LaFollette, and also those out of Congress, apply all the political pressure they can to the commission, while conservatives in and out of Congress have refrained from applying such pressure to it.

Since the Transportation Act has been in effect, although the commission has so regulated rates that only in the year 1926 have the railways succeeded in earning what the commission held would be a fair return even on its own "tentative valuation," which was based on pre-war costs, no large group of railways has appealed to the courts from any important decision rendered by it. In its first really important decision regarding valuation it has, however, so completely disregarded what has always been understood to be the law upon this subject, and so completely adopted the most extreme radical views, that all the railways of the country must support the little O'Fallon railway in seeking from the Supreme Court of the United States a decision regarding the important factors that must be considered in valuation and the weight that must be accorded them.

New York Central Handles Scrap on Big Scale

Gets higher value by more complete preparations at Cleveland plant—Demolishes locomotives quickly



Looking Toward the Front End of the Scrap Plant—Crane 60 ft. High on Right

THE New York Central is conducting a scrap-handling operation at Cleveland, Ohio, which is the largest railway activity of its kind in the country, and, in certain respects, the most unusual. It involved the unloading of 6,187 cars last year and the handling of over 195,000 gross tons of scrap, including 145 locomotives. Locomotives have been demolished at the rate of 4 per day. Two hundred and thirty-two men and as many as five traveling cranes are employed in the work, and in addition to the handling of scrap, a half million dollars is spent each year on reclamation. These operations bring in from $3,500,000 to $4,000,000 a year and the savings over former methods are estimated at $500,000 or more as follows:

	1924	1925	1926
Savings by preparing scrap	$165,403	$157,140	$73,668
Savings by sorting	207,759	92,113	89,582
Savings by salvage and reclamation	*685,570	401,807	451,061
Savings from demolishing locomotives and work equipment.....	.....	34,290	82,170
Total	$1,058,732	$685,350	$696,481

* New value less cost of scrap and repairs.

This work was inaugurated at Cleveland three years ago and is the result of a special arrangement with one of the large steel companies in that territory. It grew out of the desire of the New York Central to get the highest possible value for its scrap and that of the steel company to supply its needs in this direction at the least possible cost, all things considered. Prior to this time there was no scrap-handling plant in the present conception of that term, nor, for that matter, was any scrap-handling practice universally followed. The general practice was to ship all miscellaneous mechanical scrap from the Lines West to Collinwood on the outskirts of Cleveland, Ohio, and to Elkhart, Ind., and that from the lines east to East Buffalo, N. Y., West Albany, Oswego and Avis, Pa. At these points it was sorted into the A.R.A. classification and sold periodically to the highest bidders. Locomotive cranes were used for scrap handling but power equipment was meager and at all points the minimum labor was expended in handling. The only cutting was that required to facilitate the loading of cars. Many of the cars and retired locomotives were sold intact. Reclamation activities were distinctly limited.

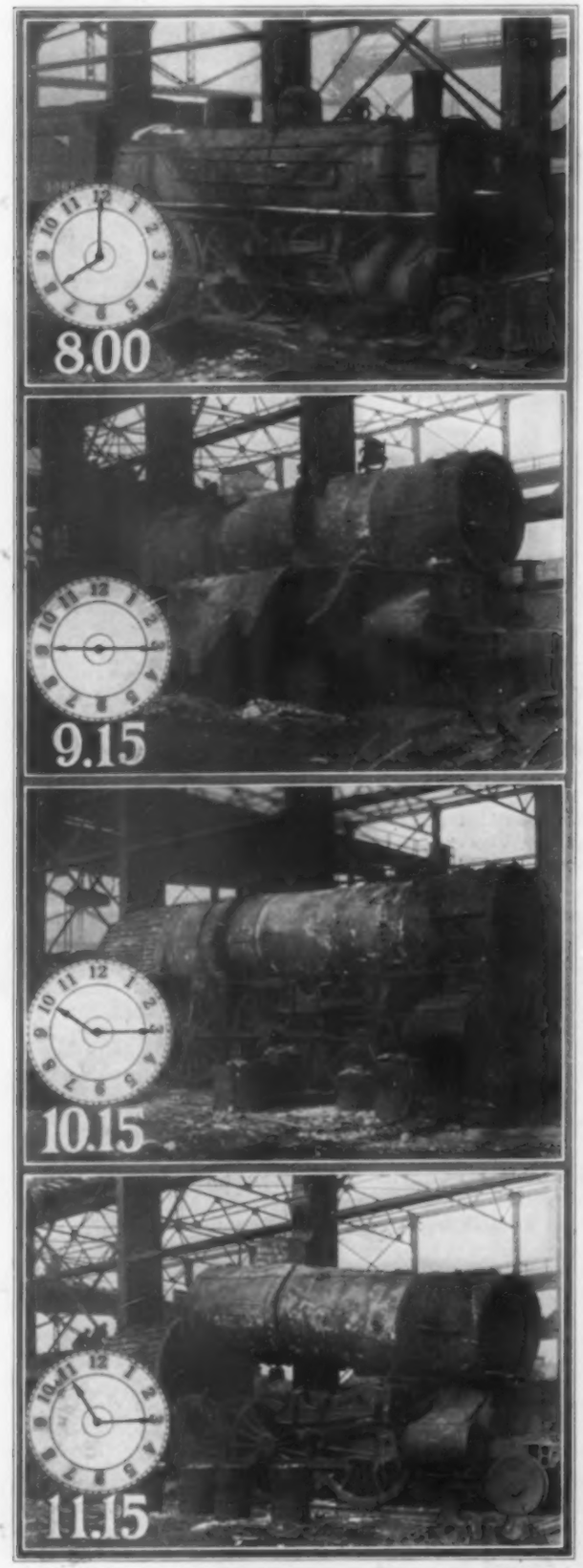
Sell Direct to Consumer

Negotiations were started with the McKinney Steel Company with a view to selling direct to this company the scrap commonly used in open hearth furnaces. Consideration was particularly given to scrap which the railroad had been selling under 30 A.R.A. classifications as follows:

A.R.A. Class	Material
1	Arch bars and transoms, iron.
2	Arch bars and transoms, steel.
7	Angle and splice bars.
8	Angle and splice bars, patented.
10	Boilers, fireboxes and tanks.
29	Lined iron and steel.
31	Melting steel, heavy No. 1.
32	Melting steel, heavy No. 2.
36	Rail steel, No. 2.
37	Rail steel, No. 3.
11	Boilers, fireboxes, cut up.
12	Brake beams, uncut.
13	Built-up bolsters.
14	Bushelling, No. 1.
21	Cast steel No. 1.
22	Cast steel No. 2.
23	Cast-steel bolsters.
26	Frogs and switches, uncut.
27	Flues, tubes and pipe, No. 1.
28	Flues, tubes and pipe, No. 2.
38	Rail steel, No. 4.
40	Structural wrot iron, uncut.
41	Structural steel, uncut.
42	Steel scrap, No. 1.
46	Steel, manganese.
49	Tires, No. 2.
57	Wrot, No. 1.
58	Wrot, No. 2.
59	Wrot iron locomotive frames.
60	Demolished steel cars and and tenders.

The steel company, appreciating the advantages to be derived in securing clean railroad scrap unmixed with yard scrap and of obtaining it direct from the

producer, agreed to buy this scrap at the going price of heavy melting steel and busheling if prepared to charging box size.



An analysis of the scrap being produced on the railroad which had been sold from various points during the five years previous, and an analysis also of the purchases made by the steel company during the same period, satisfied the road that in the aggregate the going price for heavy melting steel and busheling scrap in the territory considered, was an equitable measure of current value, all things considered, including the effect of freight charges on the market at various points. It saw an economic loss in its previous practice of selling scrap for use by the steel company which because of its uncut condition necessitated the passage of a considerable amount of it through yards for further preparation after leaving the road and it was convinced that with the facilities proposed, such a preparation of the scrap as would bring heavy melting steel prices would be profitable.

It also saw an opportunity for a saving in general handling expense, and while skeptical of the savings in much of the reclamation work observed over the country, was won over to the possibilities of more systematic and intensive activities in this direction, particularly when confronted with a chance to do such work in a location where there would be no confusion in segregating the expenses involved and where the volume, due to consolidation, would be sufficient to make repairs on a production basis.

Half-Million Dollar Plant

The outcome of the decision to undertake this work was the erection of a scrap-handling plant costing $535,000, including land and track. Construction was begun in August, 1923, and completed in 1924. This plant was shortly supplemented by reclamation facilities erected by the railroad which were subsequently increased from 9,000 sq. ft. of floor space to 18,900 sq. ft., the buildings and equipment representing a present investment of approximately $85,000.

The scrap-handling facilities comprise two overhead crane runways and five traveling cranes with magnets. The main runway is 720 ft. long and 80 ft. wide, connected at the top by sway bracing which gives the structure the appearance of being the skeleton of an uncompleted mill building. There are four traveling cranes in this structure, supported 30 ft. above the ground. These cranes have a capacity of 10 tons each, a bridge travel of 350 ft. per min., trolley travel of 175 ft. per min., and a hoist travel of 55 ft. per min., and carry 60-in. magnets capable of picking up 1,800 lb. of miscellaneous scrap.

A portion of the columns on one side of the main runway form one side of a second runway which is

Steps in Demolishing a Locomotive at the Scrap Plant When 63 Were Junked at the Rate of About 4 Per Day

160 ft. long and 75 ft. wide, and which supports a traveling crane 60 ft. above the ground, primarily for locomotive dismantling purposes and for operating a skull cracker. The crane in this bay has a capacity of 15 tons, a bridge travel of 250 ft. per min., a trolley travel of 175 ft. per min., and a hoist travel of 100 ft. per min.

In each area are two tracks, one along each row of columns and in the main bay are six shears,—three with 36-in. blades, two with 24-in. blades and one having an 18-in. blade. In addition to these facilities, oxy-acetylene equipment is provided for cutting purposes, originally comprising 20 cutting torches supplied from batteries of gas tanks distributed in the yard, but now including 40 cutting torches served from an acetylene generator house near the dock and a distributing system having outlets at regular intervals along one side of the main runway.

Wheels and Axles Not Counted

The organization, comprising a total of 232 men at present for all activities including reclamation, is outlined in the chart, from which it will be seen that the scrap handling is carried out under the general supervision and inspection of the railroad, but is performed by forces of the steel company which bills the railroad for the cost.

The practice is to consign to this plant all miscellaneous scrap collected on the New York Central. This does not include car trucks, wheels, axles, scrap brass, car lots of turnings and borings or No. 1 rail, etc., which are normally separated from other materials when first collected and require no further sorting prior to disposal. Neither does it include materials like tools, tinware, etc., which have been separated for purposes of repair or reclamation, for the policy is still followed of having such materials repaired locally. With the exception of the above items, however, the shipments to the Cleveland plant include all scrap resulting from the dismantling of retired cars. It also includes all roadway and track scrap collected from line points.

Scrap is switched into the plant twice a day in lots of approximately 14 cars, one switch being made at night and the other at noon. Only one track, that on the opposite side of the plant from the reclamation area is used for this purpose. The other track, that on the side next to the reclamation plant, is used exclusively for loading outbound business. This practice is followed for two reasons, (1) to keep the scrap-handling work moving in one direction across the dock, and (2) because of the necessity of checking the empty weight of every car loaded with scrap for sale, which could not be done if cars were loaded with scrap immediately after being emptied. A scale is situated about 300 ft. in front of the building where it can serve the four tracks in the scrap dock and the track in the reclamation area.

Seven Floors for Scrap Handling

There are no bins, racks, or platforms in the scrap dock, nor are there any fixed boundaries which separate one part from another, but for operating purposes, the area is divided into seven floors. The first is a rail floor, where scrap rail is dumped and cut up. Next comes the sorting floor, over which the scrap is spread, picked over and classified. Beyond that is a burning floor, so-called, where any material on the sorting floor requiring torch work is carried. The next floor is another sorting floor. Then comes a large burning floor and finally the last sorting floor, which is separated from the burning floor by a crossroad upon which a tractor carries salvagable material to the reclamation area.

It will thus be seen that the area is divided into alternate burning and sorting floors so that each burning floor can serve scrap pickers on each side, the basic plan being to divide the work into groups which can be supervised readily and so that the various operations can be carried forward with equal progress at all points. A shear is installed on each sorting floor, and each floor is in charge of a foreman, all of whom report to a general foreman.

Looking Down the Scrap Bay Where Five Cranes Operate—Inbound Cars on Left, Outbound on Right

The first step in the scrap-handling operation is the preliminary examination of inbound cars by the general foreman to determine what cars to switch and in what order they shall enter the plant. After being weighed, these cars are spotted with a view to the greatest expedition in unloading.

With the aid of the cranes the scrap is unloaded into the area adjacent to the car, care being taken to carry out the unloading work so that as far as possible the

material does not pile up on the sorters and so that the scrap is spread thinly over the area to facilitate handling. In all cases where material is transferred some distance from the car, cranes carry their load along the top of the car to save the men in the dock from injury, if pieces should fall. The average travel of the crane in unloading cars is about 50 ft.

Since the Cleveland plant handles all the miscellaneous scrap for the railroad, there is not only the problem of preparing the scrap for the steel company, but

Typical Cars of Mixed Scrap Arriving at Scrap Plant

of sorting out other classes of scrap for sale on the general market and picking out all salvagable material. In the sorting process the familiar method is followed of sorting all scrap into its several classifications simultaneously by forming little piles of each classification. In the work at Cleveland, however, one sorting operation commonly followed is saved by leaving behind all scrap falling into the heavy melting steel class, which material is subsequently gathered like that in any other pile of assorted material and loaded by a crane into cars on the outbound track.

Cut Scrap to Charging Box Size

A distinguishing feature of the Cleveland operation is the large volume of torch and shear work done to prepare the scrap covered by the contract with the steel company for sale at the price of heavy melting steel and busheling. This means that all of the tonnage falling into the 30 classifications noted above not only must be cut up by shear or torch to heavy melting steel, but that it must also be reduced to charging box size, which limits the length of such articles as rails to 6 ft., sheet steel ⅛ to ¼ in. thick to 12-in. by 18-in. sections and busheling to 8 in. by 8 in.

An indication of the extent of this work is gained from the fact that 43 burners and 10 shear men were engaged in these preparation activities during 1926, the work involving approximately 150,000 tons of scrap divided, in the light of A.R.A. classifications as follows: 480 tons of arch bars and transoms, 12,000 tons of boilers and fireboxes, 1,500 tons of brake beams, 135 tons of bolsters, 7,500 tons of cast steel, 520 tons of cast-steel bolsters, 2,700 tons of frogs and switches, 8,700 tons of flues, tubes and pipes, 26,500 tons of No. 1 and No. 2 heavy melting steel, 12,000 tons of steel rails, 29,500 tons of structural steel and iron, 2,000 tons of tires, 27,000 tons of wrot, 4,000 tons destroyed steel cars and tenders, 10,000 tons sheet scrap and 5,500 tons angle and splice bars.

Break Rail by Dropping

In connection with scrap preparation, so-called certain operations stand out prominently for their effect in economizing the work. The first is found in the present method of reducing scrap rails to charging box size, of which over 12,000 tons are handled each year. During the first year this work was done at the plant under a contract with a gang of negroes, who went through the laborious operation of breaking each rail with sledges after first nicking it on one side and then on the other. A study of all items that have previously been cut with torches to find where breaking and shearing could be substituted led to the abandonment of this practice for one under which the rails are first spread thinly over the ground by magnet so that each rail can be reached, after which notches are cut in the base of the rail with a torch and the rail then lifted by a magnet to a height of about 15 ft. and dropped. This process invariably breaks the rail at the points burned and by so doing has reduced the cost of preparing them approximately 50 per cent. The grooved locomotive tires are handled in the same manner, the process in this case being merely to cut through the flange of the tire before breaking. Another improvement in the process is the reduction in the cost of burning by installing a generator and an underground distributing system with manifold outlets for supplying the cutting gases, in place of the former practice of keeping tanks in the yard.

More recently, as a result of an investigation following an increase in the volume of scrap sheet steel reaching the plant, a class of material which requires both cutting by torch and shear, it was found permissible to cut such scrap into 12-in. by 18-in. pieces instead of 8-in. by 8-in. pieces, a practice which has not only

One of the Gas Outlets

effected substantial reduction in the cost of preparing this material, but an increase of approximately $2.40 a gross ton in its value, due to the superior quality of the material over that normally accepted on the market as busheling.

Quick Work in Junking Engines

The capacity of the Cleveland plant for large and rapid operation has been illustrated by the fact that in 1926 when 6,187 cars containing 177,385 net tons of scrap were received at the plant no charges were sustained for demurrage, the cars being held less than two days on the average. Also, the total tonnage han-

dled and shipped from the plant, including reclaimed products, was 195,028 gross tons.

The real test of the plant's capacity came in 1925, however, when it was suddenly decided to demolish 63 retired locomotives at this point. These locomotives weighed approximately 100 tons each. They came in December and the goal was to complete the work before the close of the year without seriously interrupting other scrap operations. The work was begun on December 16, and completed by December 31, which meant that four locomotives a day on the average were stripped of their salvage parts and, with the aid of magnets and gas torches, reduced to junk. The photographs of Engine 4661 illustrated in the pictures shows the progress made and the processes followed in the demolishing work. The first photograph shows the engine at 8 a. m. in the high bay of the plant under the 15-ton crane. At 9.15 a. m. the stack and sanders, the piping around the boiler and also the lagging are gone and a torch is cutting the boiler shell loose from the saddle casting. At 10.15 a. m. the cab and all the fittings are gone. An hour later the boiler is removed and by 12 o'clock, four hours after the start was made, nothing remains but the wheels. The 63 locomotives involved in this case weighed a total of 5,691 tons and are said to have been demolished at a saving of $34,490.

The locomotive junking work done in 1926 was not carried out under the pressure that prevailed in 1925, but it involved 145 units, as compared with 63 units in the previous year, and was done with a regularity that affords a better picture of the present methods followed. Briefly the start is made by knocking off the smoke stack and sanders, which is done simply by swinging the magnet, an operation in which the crane operators frame cut between the running gear and the cylinders, leaving the wheels and axles to be separated from the frame and deposited with all parts where the final reduction process is carried out.

By following this procedure, the locomotives last year, representing an aggregate of 14,741 net tons or 102 tons each, were calculated to have been demolished at a saving of $81,020 over what it would have cost to conduct the same operation under contract. When the work was finally completed and the scrap prepared for sale the products of the demolition comprised the following:

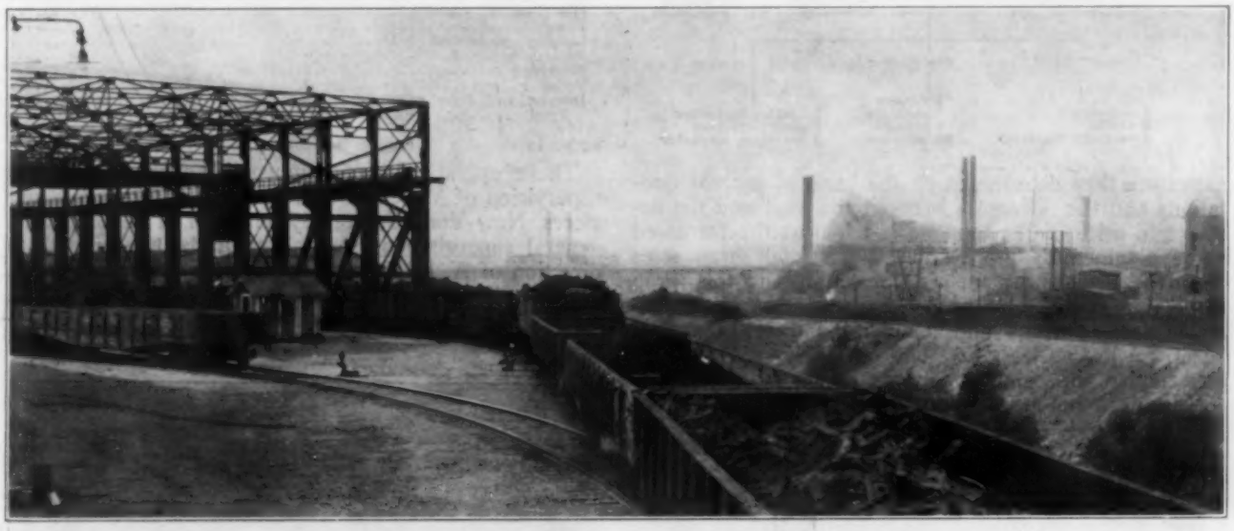
12,685 tons of scrap iron sold for	$183,176
137 tons of scrap brass sold for	35,863
1,919 tons of reclaimed materials valued, when figured at 60 per cent of the new value, at	185,302
Total production	404,341

The following is the total tonnage produced in 1926 at Cleveland, classified as the material was sold to the McKinney Company or elsewhere:

Classification	Net Tons
Heavy melting steel, No. 1	125,844
Busheling	14,394
Heavy melting steel, No. 2 (car sides cut 12 in. by 18 in.)	5,887
Rail, No. 2	3,220
Couplers and springs	2,338
Mixed turnings and borings	174
Heavy steel turnings	94
Angles and splice bars	961
A. R. A., Class 15, No. 1 cast	6,829
A. R. A., Class 16, No. 2 cast	1,488
A. R. A., Class 17, No. 3 cast	2,685
A. R. A., Class 18, No. 4 cast	4,419
A. R. A., Class 19, Brake shoes	2,288
A. R. A., Class 30, Malleable	4,097
A. R. A., Class 43, No. 2 steel	2,567
Reclaimed	10,743
Total	195,028

The Magnitude of the Savings

As stated previously, the savings obtained at the Cleveland plant were a summation of those obtained



Outbound Scrap Leaving Plant in Final Condition for Sale

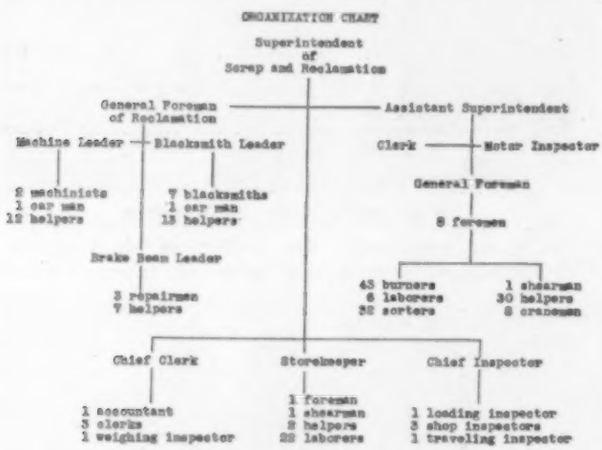
soon become expert. Four strippers then mount the engine, two in the cab removing all fittings and two directing their attention to stripping off the lagging and jacket. As soon as the boiler strippers clean a strip around the boiler in front of the firebox, two burners take positions on each side of the boiler and begin severing it from the firebox. At the same time two other burners begin severing the front end of the boiler from the saddle casting and all braces. A chain is then thrown around the shell, a hoist signaled, and the boiler swung to the ground where the front flue sheet is severed from the boiler shell by the torch and the flues pulled out. Meanwhile the firebox is removed and the

from scrap preparation, scrap sorting, locomotive demolishing and reclamation. This results from the effort to compare the work at Cleveland with that done under former conditions on this road. The method of arriving at the savings from locomotive demolishing has already been mentioned.

The determination of the savings from scrap preparation is more complicated. The procedure is to determine how much more money the scrap tonnage sold for than the same tonnage would have sold for under the former classification and then to deduct from that increased revenue the cost of the additional work done in preparing the material, over what it cost under the

old plan, remembering that the volume of scrap formerly sold under 30 classifications at the price offered for each classification is now consolidated and sold under three classifications.

To determine accurately how much more the scrap brought would necessitate keeping up the record of the tonnage produced in each classification so that in each case the tonnage at the agreed price could be compared with the value of the same tonnage if sold under the classifications. Since this is no longer done under the plan of consolidating all the classes of scrap into three, the next best plan was adopted of assuming that the present tonnage is comprised of the several classes of scrap in the same proportion that the tonnage of each class bore to the total of the 30 classes before, and of determining what that percentage of the total tonnage was for each kind of scrap considered. With these percentages the figures for the tonnage sold to the McKinney Company at the prices of heavy melting steel, No. 2 melting steel (car sides 12 in. by 18 in.), and bushelling are then split up to arrive at the tonnage of each class under the old method. The value of these tonnages are then determined on the basis of current quotations and the difference between the total and the actual sale price of the tonnage is taken as the increased value obtained by preparation. The total scrap sales from the Cleveland plant are not confined to this scrap alone, but cover sales of brake shoes, cast iron, malleable iron, springs and couplers, and miscellaneous sheet (A.R.A. Class 43), but obviously this scrap is sold under the same conditions as it was before so that it need not be considered in determining savings from preparation. The increase in value obtained under this method was figured at $345,547 in 1924, $303,913 in 1925, and $343,057 in 1926.



Preparing Scrap in 1926

Increased value of scrap		$343,057
Costs of preparation—		
Supervision	$12,958	
Shear labor	49,783	
Shear power	2,587	
Oxy-cutting labor	71,430	
Oxygen	98,038	
Fuel gas	20,477	
Miscellaneous supplies	3,811	
Liability insurance and hospital	4,098	
Repairs to plant	6,204	
Total		269,389
Savings account preparation		$73,668

After having determined this increase in value by preparation in any year, the next step is to determine the additional cost involved in carrying out such work. This requires a segregation of the preparation costs from the sorting costs at the plant and is composed of the following items: Supervision, shear labor, shear power, oxy-acetylene cutting labor, the value of the oxygen used and of the fuel gas used, the value of miscellaneous supplies, and liability insurance and hospital maintenance, and repairs to the plant. Having determined this cost the final saving by preparation is obtained by subtracting this cost of preparation from the increase value obtained, this saving, as recorded earlier in this article, having been $165,403 in 1924, $157,140 in 1925 and $73,668 in 1926. The itemized costs of preparation for 1926 are found in the tabulation in the first column.

Sorting Costs Reduced

The determination of the savings from sorting involves the comparison of the present cost of sorting with the average of the cost on the other roads in the New York Central Lines, whose facilities are comparable to those formerly used by the New York Central railroad. On this basis the cost of sorting the scrap at Cleveland under the 1923 cost would have been $373,986 in 1924, $259,131 in 1925, and $290,784 in 1926, considering all classes of scrap handled at Cleveland plant The actual cost charged to sorting at Cleveland, however, was only $166,227 in 1924, $167,018 in 1925 and $201,202 in 1926, this cost comprising supervision, miscellaneous labor, miscellaneous supplies, electric power, liability insurance repairs to plant, and switching. The cost for 1926 also included taxes and a charge for interest and depreciation on the plant. The charges for sorting the scrap handled in 1926 are shown in the tabulation.

Sorting Scrap, 1926

Cost of sorting on basis of old facilities		$290,784
Cost of sorting on 1926 basis—		
Supervision	$25,604	
Miscellaneous labor	72,254	
Miscellaneous supplies	3,138	
Power	8,828	
Liability insurance	3,314	
Repairs to cranes	10,405	
Switching	41,586	
Taxes	9,205	
Interest and depreciation	25,848	
Total		201,202
Saving by sorting with present facilities		$89,582

These operations are conducted under the general supervision of W. C. Bower, manager of purchases and stores, New York Central System, and of C. C. Dibble, general supervisor of stores, and under the immediate direction of A. L. Prentice, general supervisor of scrap, New York Central Railroad, to whom we are indebted for the above information.

The "Shasta" of the Southern Pacific near Shasta Springs, Cal.

C. & O. Aquisition Plan Hearing

Testimony at I. C. C. hearing on proposal for stock control of Erie and Pere Marquette

WASHINGTON, D. C.

PRESENTATION of evidence by witnesses representing the Chesapeake & Ohio in support of its application for authority to acquire stock control of the Erie and Pere Marquette railways, at the hearing before C. D. Mahaffie, director of the Bureau of Finance of the Interstate Commerce Commission, which was begun on May 10, was continued to May 18, when an adjournment was taken to June 1. A brief outline of the testimony of W. J. Harahan, president of the C. & O., was reported in last week's issue. Following is an abstract of that part of his statement dealing with the advantages expected to result from the plan, as an intermediate step toward later unification of the properties:

President Harahan's Testimony

The situation of the Chesapeake & Ohio stockholder is that the trend of events shows that proposed consolidations are being developed all around it. Railroads formerly independent are becoming allied with other interests, which tends to limit the expansion of the Chesapeake & Ohio Railway's business. Unification is progressing to such an extent that the Chesapeake & Ohio must take such steps as will protect its future.

The Chesapeake & Ohio must either be the dominating factor in a strong system or it must be content to be absorbed into some other system as a subordinate entity, or endeavor to remain independent, which in my judgment is an improbability and not in the interest of the public or of its stockholders. Its purpose in being the dominant factor in a strong system is to protect its patrons, both consignees and consignors, so as to enable them to prosper and be in position to do business efficiently in any territory to which they desire to ship their products. The benefits to be derived from this are mutual, both to the railroad and the shipper and they also produce benefits to the public outside of the railroad and its patrons because of the advantage of vigorous and aggressive competition furnished the various localities through system operation. The Erie and Pere Marquette are the only large railroads which are unattached, the control of which will enable the Chesapeake & Ohio to match its rivals so as to compete with them on anything like even terms. If the Chesapeake & Ohio is not allowed to obtain control of these properties other roads will do so, because no plan of consolidation can be made without disposition of them into some strong system, and I believe there are several other lines willing to take advantage of the opportunity to obtain control of them. If the Chesapeake & Ohio Railway cannot have the means of disposal of its output it will simply deteriorate into a local road and cannot insure its patrons the unrestricted opportunity of placing their business in all the markets of the west, except as in a secondary position to the Pennsylvania, Baltimore & Ohio and New York Central.

As to the situation of the Erie stockholders, they will be benefited in this plan by reason of the greater business which it can obtain in such an alliance. Business will be thrown to it, which will materially increase the gross earnings of that property. If the Chesapeake & Ohio does not acquire the Erie I believe it will be taken over by some other system. The Chesapeake & Ohio is more complementary to and supplementary of the Erie than other lines with which it has been suggested it might be consolidated. The Erie is a natural extension of the Chesapeake & Ohio and Hocking Valley Railways into the western territory via Chicago and Erie junctions east of Chicago, so it is the natural route for such business. The Erie from Marion, Ohio, to Youngstown, New Castle and the Shenango and Mahoning industrial centers is also a natural extension of the Chesapeake & Ohio and Hocking Valley and will furnish an effective route to these points. The Erie can be operated more economically in connection with such a system, as compared with being operated independently.

As to the situation of the stockholders of the Pere Marquette: much additional business can be thrown to the Pere Marquette that is now being handled with other railroads. The road will be given better outlets, because of better service by system operation, and the stockholders will obtain the greater and more assured profit from the greater volume of business thereby obtained. The Pere Marquette will be strengthend by this alliance. The railroads such as the Pennsylvania, Baltimore & Ohio and New York Central, which now connect with it, will deliver as much business to it as they now do because the business they deliver is that which the Pere Marquette people obtain through solicitation, or is controlled to the Pere Marquette by reason of its favorable terminal facility service or the industries being local to it. It will be in a better trading position for traffic than it is today.

Financial Features of the Application

The Erie and Pere Marquette cannot be purchased any cheaper than the terms herein recommended. The question naturally asked by the Chesapeake & Ohio stockholder therefore is, can the Chesapeake & Ohio afford to purchase control of them at these prices? Will the Chesapeake & Ohio be assuming obligations which will impair its ability to serve the public and which will produce a poorer result to its stockholders than if it proceeds along present lines, with the certainty of having to depend on rival systems to deliver its freight to its consumers because there are no independent railroad properties left which will not be a direct competitor to the Chesapeake & Ohio? The answer to these questions rests largely on the financial results of the operation of the proposed system.

The system which it is proposed in this application to constitute would be a strong system, comparable as to the rate of return upon its book investment with the systems with which it will compete, viz; the New York Central, Baltimore & Ohio and Pennsylvania, as shown by the following:

Ratio of net Railway Operating Income to Investment in Road and Equipment.

	New York Central System	Pennsylvania System	Baltimore & Ohio System	Chesapeake and Ohio Group
Year ended December 31, 1923..	7.12%	4.01%	5.36%	4.48%
Year ended December 31, 1924..	5.81%	3.72%	4.66%	4.49%
Year ended December 31, 1925..	6.22%	4.68%	5.25%	5.32%

Future Development Along Permanent Lines

This statement indicates that the system will be enabled to develop its property along permanent lines so as to form an effective and efficient transportation unit. This is one of the most important results of the carrying out of this proposition because as the situation is today no road, however favorable its financial condition is, can afford to freely invest large amounts in new facilities unless it is absolutely assured of a permanent business, which can only come about through some permanent relationship. The only other method that the Chesapeake & Ohio could adopt to obtain such necessary outlets would be to build railroads more or less parallel to these systems which would mean duplication of the existing facilities and unnecessary expenditure of capital, if permitted by the Interstate Commerce Commission, all of which would throw enormous burdens upon the public, which are unthinkable as long as existing lines can be secured.

The financial situation of the Erie will be improved by reason of this alliance, because it will be allied with three lines which are showing better financial results than it is. By reason of this fact the Erie will be enabled to more easily develop credit to finance improvements which will enable it to handle business mor economically and give better service to the public than it can by remaining independent. The stockholders will benefit from the increased volume of business thus obtained and will also benefit from the decrease in expenses thus brought about.

The improvements which will have to be thus financed are not large but will greatly improve the Erie's ability to obtain greater net income.

The financial condition of the Pere Marquette will be improved because of the knitting of it together into a strong system, giving it permanent traffic.

Use of Erie Lines

Upon the completion of the Chesapeake & Hocking there can be handled via Columbus, the Hocking Valley and Erie, about 2,500,000 tons of coal per annum, which is now being handled via Cincinnati and the Chicago Division of the Chesapeake & Ohio from Russell, Ky., to Chicago and points beyond. It is

calculated upon the most conservative basis that the saving per annum in cost of handling this business via the new route will be $1,150,000. It is absolutely essential to have this additional outlet in order to permit the development of the additional westbound business which the Chesapeake & Ohio can develop if it will furnish the necessary facilities and the additional business which the Chesapeake & Ohio can obtain therefrom is more important to the public and the Chesapeake & Ohio than the saving from handling of the traffic which it now has. As a matter of fact there is approximately 5,000,000 tons of coal per annum originating on the Chesapeake & Ohio lines which goes to Chicago and points beyond. The excess over the 2,500,000 tons above mentioned, being now handled via other routes which short-haul the Chesapeake & Ohio. The Chicago Division of the Chesapeake & Ohio will still continue to handle business to its capacity, thereby retaining at least whatever profit is now made on this division, the Chesapeake & Ohio receiving, in addition thereto, the profit made by the Chesapeake & Ohio-Hocking Valley on this 2,500,000 additional tons via that route, together with the profit which will be received from handling whatever portion of the 5,000,000 tons can be secured via the Marion route. This business will increase as the operations in the Chesapeake & Ohio's coal territory will expand. This $1,150,000 is a direct saving to the public, that is in the cost of operation of the transportation system. No additional capital expenditures will be required to handle this business either on the Chesapeake & Ohio, Hocking Valley or Erie.

The Chesapeake & Ohio and Erie railroads run practically parallel with each other from North Judson, Ind., to Griffith, Ind., a distance of 41 miles, between which points practically no traffic originates. The Chesapeake & Ohio has a single track line with 1 per cent grade. Between the same points the Erie has a double track railroad with a .2 per cent grade westbound in the direction of the Chesapeake & Ohio's heavy traffic, which is used to less than 50 per cent of its capacity. By routing the Chesapeake & Ohio's trains from North Judson to Griffith over the Erie's tracks it is conservatively estimated that a saving of $168,000 per annum can be made, based on 1926 traffic, which it is thought will be the minimum traffic which will be handled by the Chesapeake & Ohio between these points. Under stock control, with separate operation, arrangement would have to be made so that each road would be given its equitable proportion of this saving. In the event of unification the entire saving would of course go to the unified system. In either event the entire saving will inure to the public benefit.

Locomotive Repairs

The Chesapeake & Ohio contemplates addition to its shops which will enable it to take care of 945 classified repairs per annum. It will require, in order to properly care for its engines, 976 classified repairs per annum, a shortage of 31 engines per annum. The Erie Railroad now has a capacity of 1,148 classified repairs per annum. It requires, in order to properly take care of its engines, 1,000 classified repairs per annum, thus having a capacity in excess of its requirements of 148 classified repairs per annum, so that they can take care of the Chesapeake & Ohio's excess requirements for such repairs. These engines can be worked to and from the shops under steam, handling trains. It is calculated that the saving in repairing these engines at the Erie's shops will amount to $451,000 per annum.

The Hocking Valley's shops at Columbus are today utterly inadequate and not capable of repairing anything but the smallest size engines. To take care of the Hocking Valley's requirements there is needed a capacity of 164 classified repairs per annum. If the Hocking Valley cannot have these engines repaired in some one of the proposed system line's shops it will have to build new shops of its own at Columbus, which will cost about $1,000,000. The Pere Marquette has a modern shop at Grand Rapids, capable of repairing the large Hocking Valley engines at the cheapest practicable cost, which engines can be worked to and from the shops under steam, handling trains. It is calculated there will be a saving of $227,000 per annum by reason of the use of the Pere Marquette's shops for these repairs. This makes a total saving for the two roads of $678,000 per annum. In any event this entire amount will be saved so far as the transportation cost to the country is concerned, and in the event of unification this of course will inure to the system. In case of stock control it will have to be divided between the four railroads on some equitable basis.

Other Savings

In addition to the specific savings set out above there will be savings in accounting, all of which cannot be detailed as to the exact amount of money, but which it is apparent can be made. There will also be savings in the purchasing and stores departments, which it is impracticable to set out in exact money figures, but which it is apparent can be saved.

Recapitulation of Savings Per Annum

Use of Marion—Chicago Line	$1,150,000
Use of North Judson—Griffith Line	168,000
Locomotive repairs	678,000
Joint use of facilities at Marion, Ohio	138,000
Joint use of facilities at Toledo, Ohio	80,000
Joint use of facilities at Niagara frontier	138,000
Chicago	300,000
Saving in traffic solicitation forces	300,000
Total assignable savings	$2,952,000

The granting of this application will not impair the ability of the applicant to serve the public because the earning power of the Erie and Pere Marquette is such that the applicant will receive, in addition to the operating savings and earnings from increased business by the use of such controlled facilities, a substantial return on its investment in said companies at the prices the applicant proposes to pay for control of them.

Separate Operation Proposed

The Chesapeake & Ohio proposes, as an intermediate step toward unification, to exercise that character and degree of administrative control of the operations of the Erie and the Pere Marquette, which is inherent in control by stock ownership of each of the constituent carriers by the controlling carrier for the benefit of all of the carriers within the group proposed, and at the same time consistent with separate operation of, and accounting by, each carrier within the group. During the interval that such control by stock ownership is effective and prior to the ultimate unification contemplated, the grouped carriers will be enabled to realize to a large extent the advantages to be derived from such unification, as hereinabove enumerated, which will be in the public interest. During such intermediate control we expect, by trackage and other arrangements, co-ordinated service and co-operation between the managements of the separate operating units, to bring about better service to the public, joint use of facilities and equipment and substantial economies in operation.

Short Lines

In the event of unification by lease, consolidation, merger or otherwise the Chesapeake & Ohio is willing to lay down now the policy, for itself and the lines merged with it, namely, that it will consider each individual short line and acquire it if it seems desirable for it to do so. If the Chesapeake & Ohio deems there are compelling reasons why it should not, it is willing to submit the question, first, as to whether or not the short line in question should be continued to be operated, and second, if so operated, whether it should be allocated to the Chesapeake & Ohio, to the Interstate Commerce Commission for determination. If the Interstate Commerce Commission decides it should be operated and allocate it to the Chesapeake & Ohio System, then the Chesapeake & Ohio will endeavor to agree upon a fair value or basis of operation with the owner for the property. If it cannot do so the matter will be referred to arbitration under the federal arbitration act.

I do not see how we can specify any further detail than this, on account of the individual and consequently unknown characteristics of the various lines as referred to above, which can only be determined upon close and careful scrutiny of the line in question.

President Harahan Cross-examined

Mr. Harahan occupied the witness stand for two days, being cross-examined at length by H. W. Anderson, counsel for the minority stockholders, and when he was excused it was with the understanding he might be recalled. Mr. Anderson endeavored to bring out that O. P. Van Sweringen had suggested or dictated the various details of the plan for the acquisition of Erie and Pere Marquette stocks as a substitute for the original plan for control by the Nickel Plate, but Mr. Harahan said he had suggested to Mr. Van Sweringen the appointment of the special committee which had first recommended another effort toward bringing about the original unification, and that Otto Miller, a member of the C. & O. committee, had made the suggestion finally adopted at a meeting in New York on September 29.

He said the original plan was abandoned because of failure to reach an agreement on ratios for the exchange of stock and that Mr. Van Sweringen had offered to the C. & O. the stock of the Erie and Pere Marquette held by himself and associates at its own price. The closing

prices on the exchange as of September 24 were adopted by the committee, he said, because that was a date not affected by any special knowledge of the plan finally adopted, and lower prices could not have been fixed in fairness or justice. He said there had been no inquiry as to the prices originally paid for the stock by the Van Sweringens. Mr. Anderson brought out that at a later meeting with representatives of the minority the latter had objected to paying more than the stock had originally cost, and had asked for a statement of the dates and prices of the stock purchases. Mr. Harahan denied that the plan for a unification with the Nickel Plate which had been approved by the C. & O. board on July 2, had been "held up" by Mr. Van Sweringen, and said that while the new plan was adopted suddenly it was the culmination of extensive study of various plans. He said that the option was signed only by O. P. Van Sweringen and not by M. J. Van Sweringen or the Vaness Company and that he did not know the source of a block of 134,000 shares of Erie which Mr. Van Sweringen had said would be at the disposal of the C. & O., at the same price, but that he did not believe that any of that stock had been "fed out through the market" while the C. & O. was buying stock in the open market in the period between September 29 and October 16, the date of the written option.

Shop Facilities

Mr. Anderson asked many questions as to whether the money spent by the C. & O. to acquire Erie and Pere Marquette stock would not have been better used for improvements to the C. & O. itself, including new shop facilities. Mr Harahan said that it had spent $64,000,000 recently on improvements and that while it needed additional shop facilities some of these could be obtained at less expense by utilizing available capacity of the Erie and Pere Marquette shops.

Taking up Mr. Harahan's estimates that the purchase of Erie stock would be profitable to the C. & O., Mr. Anderson brought out that the statements of Erie net included dividends received from the Pennsylvania Coal Company but did not include deductions for sinking fund payments to pay off the coal company bonds, and that if these items were taken into account the Erie would not have shown any income for the common stock in recent years. Mr. Harahan insisted that the deductions should not be made but he agreed that the Erie would not have been justified at any time in the past ten years in paying a dividend on common stock.

Mr. Harahan said that the cost to the C. & O. of the unification proceedings had been about $40,000, carried in suspense account, and Mr. Anderson asked that the details be produced. He read a letter addressed by the minority stockholders' committee to the C. & O. board insisting that a demand be made upon the Van Sweringens for reimbursement of the amount, on which no action was taken.

Control of the Virginian

The Chesapeake & Ohio has been conducting negotiations for control of the Virginian ever since the commission rejected the application of the Norfolk & Western for authority to lease that road, Mr. Harahan said. Herbert Fitzpatrick, general counsel of the C. & O., objected to Mr. Anderson's further questions regarding details of the negotiations but Director Mahaffie ruled that they might be answered if they avoided confidential matters. However, at the request of Mr. Fitzpatrick, Mr. Anderson agreed to withhold further questions along this line until after a conference and the subject was not again brought up at the hearing.

In reply to questions Mr. Harahan said that no definite plan for the unification of the three roads had been adopted yet, as there is some prospect that Congress may change the law on the subject, and that he knew of no plan to take in the Nickel Plate or to turn the new system over to the Nickel Plate. Mr. Anderson referred to testimony by J. J. Bernet, then president of the Nickel Plate, at the previous hearing, that a saving of $502,000 a year could be effected by diverting certain traffic from the Erie to the Nickel Plate. He asked Mr. Harahan as an operating expert if this would not be done if the Erie and Nickel Plate were under common control, although with no relation to each other. When Mr. Fitzpatrick objected, on the ground that the Nickel Plate is not in the case, Mr. Anderson said that the same interests that control the Nickel Plate are proposing to use C. & O. money to buy lines that the Nickel Plate formerly proposed to acquire. "We take the position," he said, "that this joint control presents a temptation to skin the Erie for the benefit of the Nickel Plate, which we say is not in the public interest."

After Mr. Mahaffie had ruled that the question should be answered, Mr. Harahan said that the traffic should not be diverted if it would hurt the Erie. However, he said, it would be to the interest of the C. & O. to divert some of its coal traffic to the Erie instead of routing it via Chicago division provided that there was the assurance of a permanent dependable outlet via the Erie which stock control of the Erie would give.

C. & O. Earnings

Referring to Mr. Harahan's statement at the previous hearing that the earnings of the C. & O. for 1924 were abnormal, Mr. Anderson asked if the earnings for 1925 had not been greater and if the 1926 and 1927 earnings had not shown continued increases. Mr. Harahan said that while the first three months of 1927 had shown an increase of $2,932,000 over the corresponding period of 1926, of which about $2,000,000 had been saved for net, he did not expect the 1927 results as a whole to exceed those of 1926, but he said he was glad that his previous forecasts of earnings had been exceeded by the facts.

Under cross-examination by Moultrie Hitt, representing intervening short lines, Mr. Harahan said he would be willing to have the commission attach a condition to its order representing his statement of policy relating to the taking over of independent short lines.

Other C. & O. Officers Testify

F. M. Whitaker, traffic vice-president of the C. & O., testified as to traffic aspects of the roads, saying that the three lines cannot prosper in competition with the Baltimore & Ohio, New York Central and Pennsylvania systems unless they are combined into a strong system with the advantages of co-ordinated through service such as the other three systems have.

G. D. Brooke, general manager of the C. & O., gave a comparison of the operating conditions on its Chicago division with those on the line of the C. & O. and Hocking Valley and the Erie line to Chicago, via Columbus and Marion, Ohio., to show that conditions on the latter are so much more favorable as to make it possible to haul coal from Russell, Ky., to Chicago for 45 cents per ton less in direct train service cost. The Chicago line is single track and has heavy grades, he said, while the latter is mostly double track with lighter grades, and it would require 3⅓ times more trains to handle the same tonnage via the line from Cincinnati to Chicago as via the Columbus-Marion line. He estimated the out-of-pocket direct train service cost from the mines to Chicago at $1.70 per ton for the Columbus-Marion route,

against $2.15 per ton for the Cincinnati route on coal which pays a revenue of $3.02 per ton. This would amount to a saving of $1,144,000 a year on the amount of coal handled last year. He also said the capacity of the Chicago division is so limited that it now cannot handle all the C. & O coal traffic at certain seasons, while the Columbus-Marion route is capable of handling 3,000 northbound loads per day, or an increase of 125 per cent. This line would include the line now under construction by the Chesapeake & Hocking from Gregg to Valley Crossing, Ohio, to take the place of trackage via the Norfolk & Western. Mr. Brooke was cross-examined by Mr. Anderson regarding details of the cost estimates. He said that the conditions on the Chicago division route would be improved to some extent by the reduction in grade in connection with the new bridge at Cincinnati to be completed in about three years.

L. D. Freeman, assistant to the chief mechanical officer of the C. & O., testified regarding the proposed use of excess shop facilities of the Erie and Pere Marquette.

Value of the Four Companies

W. J. Conaty, supervisor of valuation of the C. & O., put into the record estimates of the "approximate unimpaired investment" in the property of the four companies, making a total of $1,040,000,000, which he said represented the use of principles followed by the commission in the St. Louis & O'Fallon case, whereas according to the valuation theories of the company the actual value would be greater. His figures were $387,634,667 for the Chesapeake & Ohio, $58,944,431 for the Hocking Valley, $465,156,003 for the Erie and $128,778,410 for the Pere Marquette, for the common-carrier property used. They were based on the commission's cost of reproduction figures as of 1914, adjusted to cover the increased prices between that date and the commission's valuation dates, and the present value of lands as of 1926.

On the following day Mr. Conaty gave the amount of the valuations of the four roads on the basis of the computations made by the companies as of December 31, 1926, as follows: Chesapeake & Ohio, $608,074,488; $89,300,528; Erie, $738,897,521; and Pere Marquette, $215,124,383, making a total of $1,651,000,000.

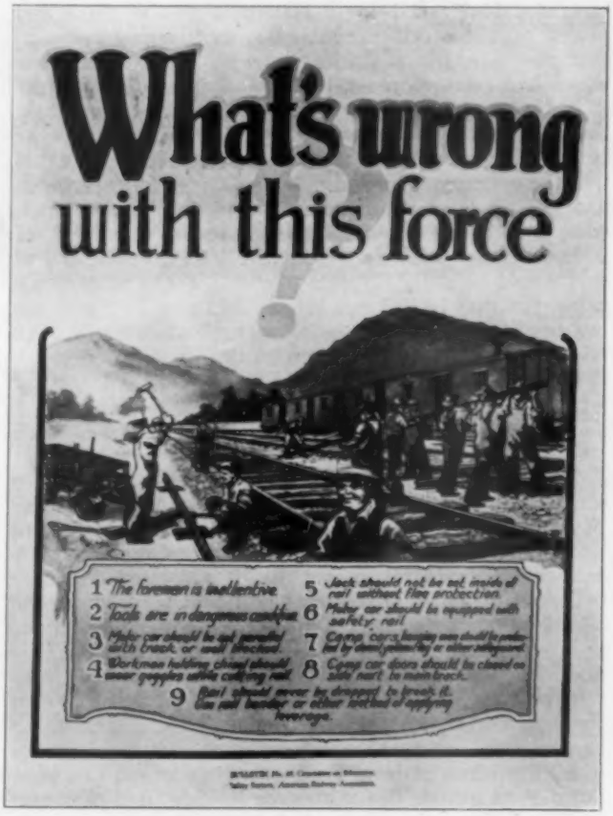
G. W. Burpee of Coverdale & Colpitts, testified from a series of charts comparing the market prices of the stocks of representative railroads from January, 1924, to March, 1927, with those of the roads involved in the application. These showed, he said, that much of the rise in prices of the latter stocks has occurred since the purchase by the C. & O.

On cross-examination Mr. Burpee said that while some of the increases in the market prices had undoubtedly resulted from the fact that the stocks were being accumulated for control, much of the increase should also be attributed to increases in earnings, as shown by charts in this exhibit relating the stock prices to the earnings of the various companies.

Boston & Maine Prize Essays.—The Boston & Maine announces that Mabel Alice Richmond, of Rotterdam Junction, N. Y., daughter of a freight conductor, has won the first prize in the contest recently conducted among children of Boston & Maine employees for the best essay on the value of the Boston & Maine Railroad to the community. The second prize went to Anna Marie O'Leary of North Adams, Mass., 11 years old, and the third to Ruth E. Wilson, of Plymouth, N. H., daughter of a car inspector.

Safety Section Program for June

INJURIES to maintenance of way and construction employees is the department of the accident record which the commitee on education of the Safety Section, A. R. A., proposes for special attention during the month of June. The campaign to reduce casualties to employees 35 per cent in seven years has been reasonably satisfactory, looking at the figures as a whole; but in this particular department, the desired progress has not been made. The casualties in this department as reported by all railroads of Class I for four years has been as follows:


What's wrong with this force
1 The foreman is inattentive
2 Tools are in dangerous condition
3 Motor car should be quit promptly with track or road blocked
4 Workmen building shield should wear goggles while cutting rail
5 Jack should not be set inside of rail without flue protection
6 Motor car should be equipped with safety rail
7 Crane cars having arms should be protected by counterweight or other safeguard
8 Crane car doors should be closed on side next to main track
9 Rail should never be dropped to break it. Use rail bender or other method of applying leverage.

Safety Section Bulletin No. 45.

	Killed	Injured	Rate per million Man-Hours	Desired Rate*
1926	488	26,376	25.67	22.54
1925	451	26,161	26.90	23.87
1924	428	26,011	27.06	25.19
1923 (Basis)	502	26,619	26.52	.....

* Rate per million man-hours as calculated on the basis of 35 per cent improvement in seven years; 1930 as compared with 1923.

The circular issued by Chairman Bentley says that nearly one-half the persons killed, as shown in this record, were struck by trains. The need of alertness on the part of men, care on the part of foremen, and obedience to the rule requiring all men to move clear of all tracks on the approach of a train, are points especially emphasized; and the lesson is particularly recommended to every man who may work alone,—not in a gang. Foremen are reminded that the frequent employment of new men tends to swell the accident figures, New men should be carefully selected and trained and when set to work should be paired with trustworthy men of experience.

Looking from the Old Viaduct Over the Partially Completed Fill

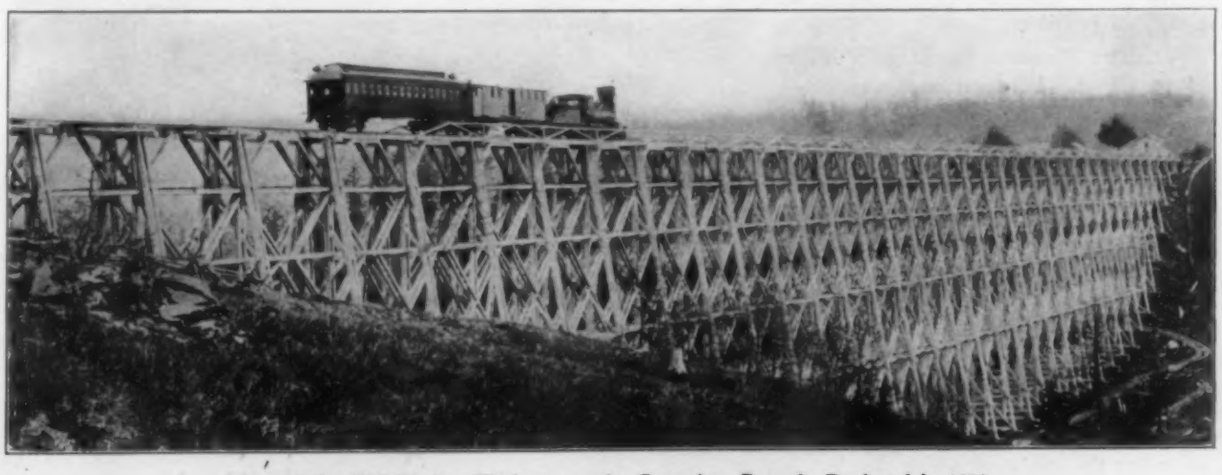
Heavy Filling Projects Present Unusual Problems

Reading eliminates 4,167 ft. of high viaducts—Unusual difficulties lead to interesting filling methods

FEW roads have undertaken the construction of embankments during the past few years equal in magnitude to those which have been built on the Reading since 1916, and a still smaller number of roads have experienced the difficulty encountered by this road in filling old viaducts up to 758 ft. in length and 129 ft. in height, and in projecting fills over unspanned valleys to a length of 3,800 ft. and a maximum height of 120 ft. The work on the Reading has been done on its single-track Catawissa branch, a 69-mile line between East Mahanoy Junction, Pa., and West Milton, where in 1916 work was begun on the filling of the first of five high viaducts varying in length from 428 ft. to 758 ft., and the elimination of two others which it was estimated would require the placing of approximately 2,750,000 cu. yd. of filling material.

The Catawissa branch of the Reading was originally built by the Catawissa & Williamsport railroad between 1835 and 1838, and at that time the seven high viaducts on this line were constructed in order to avoid a much longer route or the extensive filling of deep valleys. These viaducts were originally of wooden construction and were renewed from time to time as traffic and the weight of equipment increased, until in 1898 six of them were replaced by iron structures and in 1901 the seventh by a steel structure. All of these viaducts were of more or less simple design and consisted of a series of 35-ft. tower spans and 85-ft. intermediate spans, the former of deck plate girders and the latter deck riveted trusses. The supporting towers of the trestles were each composed of two bents connected by longitudinal bracing.

In the order of their location from the south, these



One of the Old Timber Viaducts on the Catawissa Branch, Replaced in 1898

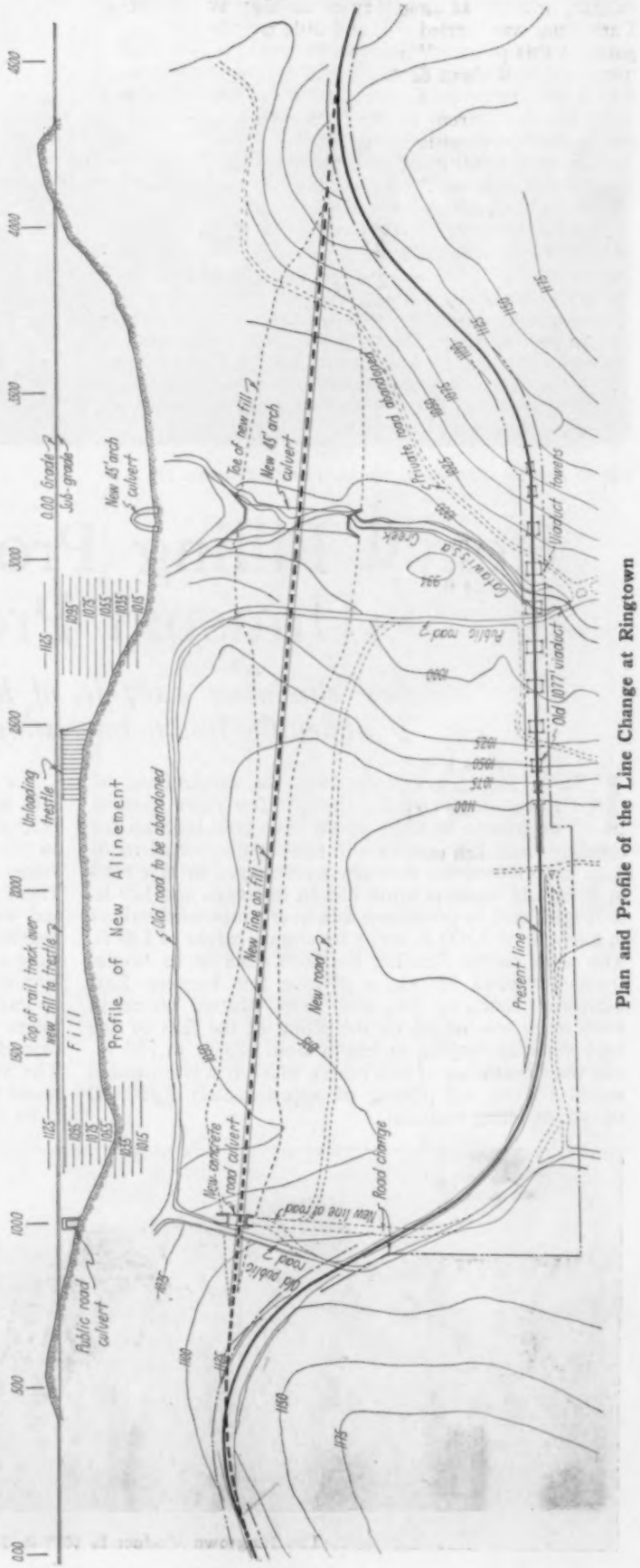
viaducts were known as Dark Run viaduct, 568 ft. long and 54 ft. high; Ringtown viaduct, 1,077 ft. long and 124 ft. high; Stranger Hollow viaduct, 428 ft. long and 94 ft. high; Long Hollow viaduct, 747 ft. long and 129 ft. high; Mine Gap viaduct, 589 ft. long and 105 ft. high; Fishers viaduct, 758 ft. long and 129 ft. high; and Mainville viaduct, 720 ft. long and 120 ft. high. All of these viaducts were located within a distance of about 17 miles on this winding branch of the Reading through the mountains of Pennsylvania. The maximum grade through this territory is approximately 0.7 per cent against southbound traffic, a grade which in fact extends almost uniformly for 35 miles between Catawissa and Lofty.

This line carries a very heavy southbound freight traffic in addition to four passenger trains daily, two in each direction, and it was because of this and the adverse grade conditions on the line that the Reading has long desired to use heavier power and to eliminate the use of pusher engines, which are still used extensively in this territory. The governing factors in this regard were, however, the viaducts which had been designed in the main for a loading equivalent only to approximately Cooper's E 40, and which would not therefore permit the use of heavier power.

Confronted with this situation it was apparent that it would be necessary either to renew all of the trestles or to replace them by high embankments. As the latter course was the most economical and permanent in the long run, and furthermore, as the Reading always has available on its line, large quantities of industrial waste, excavated material and locomotive cinders, this method of strengthening the line was adopted. To date, five of these viaducts have been filled and the work at Ringtown, which involved the construction of a long high fill across the valley to improve the alinement of the track, is now nearing completion after practically continuous filling operations since about the middle of 1922. The last of these high viaducts to be eliminated is that at Mainville, which, like the one at Ringtown, will be accomplished by the construction of a high fill on a new alinement. The work at Ringtown will be completed in September or October of this year, while that at Mainville, which is now under way, will be carried forward as rapidly as possible.

Viaduct Towers Fail Under Filling Operations

The first of the viaducts to be filled was that over Dark Run, the lowest and one of the shortest. Work at this point was begun in 1916 and was pushed to completion by June of the following year without difficulty or mishap. In making this fill, no special equipment was used and no special precautions were taken, other than to keep the fill approximately level across the valley at all stages of the work. In making the fill, every third or fourth tie was removed from the trestle and the material, which was conveyed to the work in standard hopper-bottom cars, was discharged directly from the cars through the trestle deck, entirely enclosing the steelwork which was left in place.



Plan and Profile of the Line Change at Ringtown

In like manner the filling of the Stranger Hollow viaduct, which was almost twice as high as the one at Dark Run, was carried out, and little trouble was anticipated at this point. When the fill had reached a maximum height of about 82 ft. or within 10 ft. of the top of the viaduct, however, signs of a failure of the old structure became apparent as the track began to get out of line and surface, settling considerably at several points. As a serious condition of this nature would have interfered with traffic over the line, the trestle track was immediately blocked up to make it safe for traffic and the remainder of the filling was rushed to completion.

With the thought that the trestle failure at this point was caused by something inherent in the structure itself, filling of the 129-ft. high viaduct at Long Hollow was carried on in a manner similar to that at the other two viaducts, no special precautions being taken to prevent the failure of the structure as the fill reached the top. At this viaduct, however, the fill had only reached a height of about 50 ft. when it was noted that one of the tower columns was beginning to bend just below a connection with the longitudinal bracing and a few feet above the line of the fill. Soon after, other columns began to bend and the problem arose of saving the trestle from complete destruction before the fill was completed. An attempt was first made to support the longitudinal bracing members of the towers with timbers, it being thought that the failure of the columns was due to the load of the fill on the bracing which bent it down, pulling the columns together. This method of strengthening the trestle did not prove satisfactory, however, and conditions became so acute that it was necessary to detour practically all of the traffic over another route, except passenger traffic which was transferred. Finally, large timber bents were constructed under the ends of the deck spans, the towers being cut away at the column caps so as to free the towers, which were found to be exerting a heavy pull on the structure rather than giving support. In spite of the continual settling of the timber bents in the new fill, which made it necessary to block and wedge them up continually, the viaduct was restored and kept in alinement satisfactorily enough to permit the operation of dirt trains over it until the fill was completed.

Concrete Reinforcing Precludes Trouble

In anticipation of similar trouble in filling the Mine Gap and Fishers viaducts, much study was given to the problem of reinforcing the tower columns suitably against failure. While several methods were considered, the plan finally adopted consisted of encasing each column in 30 in. reinforced concrete up to within 20 ft. of the top, where reinforced concrete struts were placed in both longitudinal and transverse planes in order to carry the load of the embankment to be placed above them. Other precautions taken included the cutting of the column bracing as the fill progressed and the placing of the filling material around the towers with shovels so that the fill at these points could be kept at a uniform elevation, thereby minimizing the possibility of lateral

Concrete Reinforcing Precluded Buckling of the Viaduct Towers at Mine Gap and Fishers

pressure being exerted against the tower columns. With these precautions both Mine Gap viaduct and Fishers viaduct were filled without trouble and without interference to traffic, little or no distortion having occurred in either alinement or grade.

With the completion of the work at Fishers, the last of the viaduct-filling projects had been completed but there yet remained the construction of large fills at Ringtown and Mainville to replace the viaducts at these points and to improve the alinement of the track in these vicinities. At Ringtown, where the work is now nearing completion, the plan for eliminating the viaduct consisted of

The Ringtown Viaduct Is 1077 ft. Long and 124 ft. High

building an embankment across the valley of Catawissa creek in a straight line between points on the original alinement on both sides of the valley, with the view of abandoning the old line which ran up the valley on either side for about 800 ft. and then crossed it over the old Ringtown viaduct. When completed, this plan will give the Reading a new level grade cut-off line across the valley, approximately 630 ft. shorter than the old line, which will in turn eliminate two sharp reverse curves and the old light viaduct.

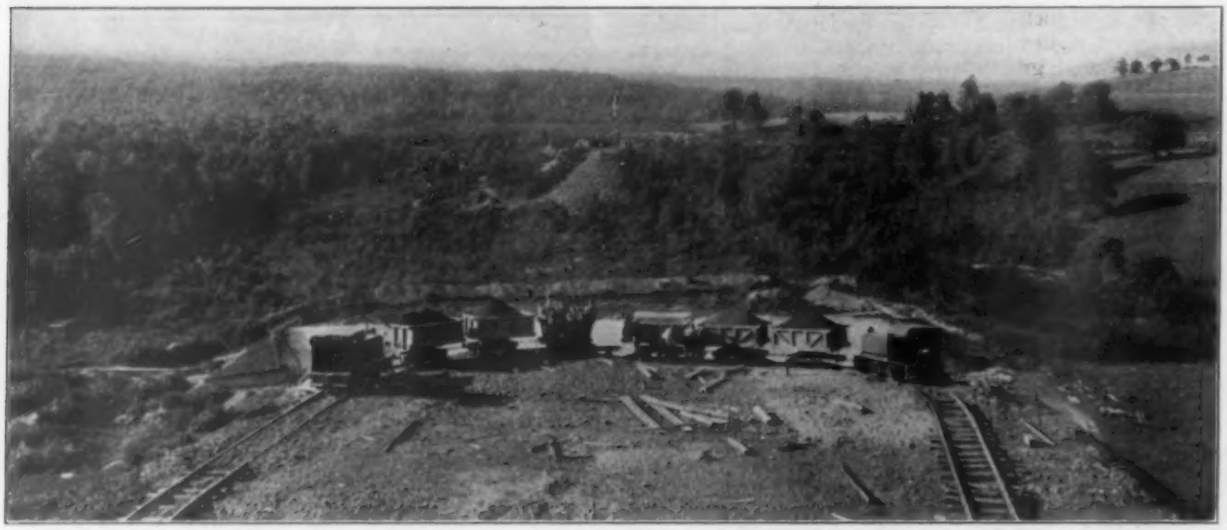
Several Methods of Filling Tried Without Success

It was desired to build a fill of over a million yards in the shortest possible time and in the most economical manner, the material to arrive at the scene of the work in standard bottom-dump cars as fast as it could be disposed of, and to be spread out in a fill about 3,310 ft. long and 120 ft. high at its highest point. To build a temporary unloading trestle across the valley was obviously out of the question, so the first attempt of the contractors was to unload the material from the cars and place it in the fill with a locomotive crane and clam shell bucket. To do this a short construction track was built at the south end of the line change, extending for 100 ft. or more in the general direction of the proposed cut-off. The crane was then run out on this track and followed by a loaded car. In this position the clam shell picked up the material from the car and cast it on the new embankment, the car being replaced when unloaded and the construction track being extended out over the new fill as it was brought up to sub-grade. Ultimately two such layouts were put in service but owing to the inherent disadvantages of this method under the conditions imposed, filling with the cranes was discontinued after approximately 100,000 cu. yd. had been put in place. In the first place, only two cars could be spotted for unloading at one time and even then the primary function of the bottom-dump cars was not utilized. Shifting movements were frequent and costly and of necessity the cranes were idle much of the time. At best, unloading by this method was slow for in most instances it was necessary to swing the loaded clam shells through approximately 180 deg. in order to cast the material out on the dump. Then too, it was difficult to remove much of the material from the cars by this method, particularly toward the bottom, and this was a serious disadvantage as it was essential that the cars be completely emptied and swept out so that they could be returned to the railroad in shape for revenue traffic.

The contractors next attempted to remove the dirt by means of a belt conveyor. In this, the end of the unloading track on the fill was raised about 2 ft. and a belt conveyor about 3 ft. wide and 100 ft. long was placed under the track, its frame being supported on light rails. With this arrangement loaded cars were pushed out over the conveyer and dumped, the material falling on the conveyor and being carried out over the end of the fill. The conveyor arrangement was operated by a small portable steam plant and as filling progressed, this plant, the conveyor and the unloading track were moved forward on the dump. As laid out, however, this arrangement also was unsatisfactory as the belt became clogged continually, and this method of filling was abandoned after relatively few cars had been unloaded.

The next experiment was an attempt to flush the material from the cars. In this the contractor established a pumping plant at the foot of the fill along Catawissa creek. From this plant a 6-in. discharge line was extended to the top of the fill and was so arranged that it would discharge directly into the tops of the loaded cars, through the use of a 2½-in. fire hose and nozzle. These cars, as in the case of the belt conveyor, were run out on a short temporary trestle about four or five feet high, beneath which was installed a heavy sheet iron trough which extended out over the end of the fill. The object of this arrangement was to flush the material through the bottom of the cars into the trough and then out into the embankment, but it proved a failure. The principal difficulty was that while the fine material was washed out into the fill successfully, the heavier material such as large rocks, clinkers and in some cases large lumps of clay remained in the trough. With this situation prevailing and with no arrangement for keeping the flushed material within the limits of the fill, this method of unloading and placing the material was soon abandoned.

The next attempt was to remove the material from the cars through a pipe by suction, and to this end quite an elaborate layout of machinery was installed on a flat car, the principal units of which, aside from the vacuum-producing machinery, were a large vacuum tank and two long suction lines of 8-in. steel pipes, these latter units ex-

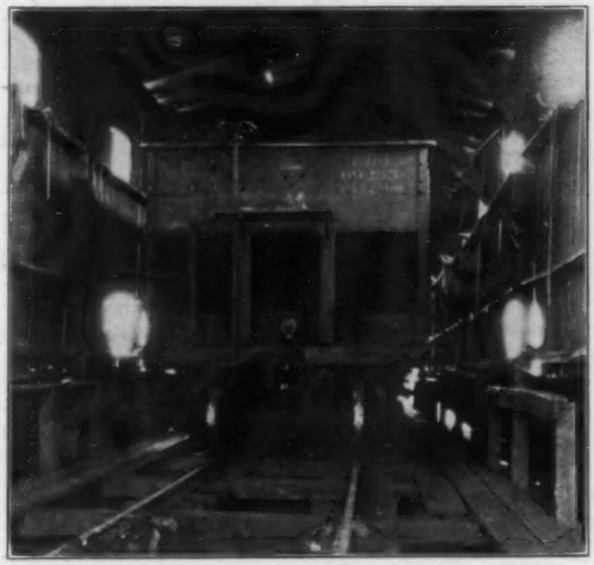


Two Trains of Four-Yard Dump Cars Unloading Over the End of the High Fill

tending over the loaded cars and being equipped with a flexible intake end which could be moved about in order to reach all of the material in the cars. While this type of equipment had been used successfully in conveying many other types of bulk commodities and while in this case, picked up all of the material including bricks and stones of moderate size, it picked them up and carried them through the discharge pipe at such a rapid rate that the main elbow in the discharge line wore through in a few hours. After a number of attempts to renew the pipe in this elbow and to substitute stronger material without success, this method of making the fill at Ringtown was also discarded after a few cars had been unloaded.

Rehandle Material from Unloading Dock

At this point the work was taken up by another contractor, who is now carrying it to successful completion, and the more or less commonly used method of dumping the material from cars into bins and then rehandling it to the fill in narrow gage equipment, was employed. This involved the construction of a substantial open-deck frame unloading trestle which was built with a capacity for unloading four cars at one time. This trestle was constructed at the extreme end of the fill, as completed at that time, which fortunately placed it on a high point in the valley where the bents could rest on the surface of the original ground. The deck of this trestle was placed about seven feet below final grade and the fill leading to it was then raised about 21 ft. by unloading cars and jacking the track. If it had not been for the fact that the trestle required bents as high as 50 ft., it no doubt would have been built at the final sub-grade so as



Hopper Cars Spotted for Unloading Within the Enclosed Trestle

to obtain the benefit of the additional seven feet in building up the embankment across the valley.

Immediately below the deck of the trestle are twelve 32-yd. hoppers, six on each side, connected at the center line so that dirt discharged from the cars divides equally into opposite bins below, all of the bins, the floors and sides of which are lined with sheet iron, taper to openings about 3 ft. wide and 10 in. high at the bottom, through which it was expected at first that the material would flow to the hinged aprons below, which, when turned up, would stop the flow and when lowered would guide the material to the narrow gage dump cars spotted beneath. This arrangement worked very satisfactorily when handling cinders and other loose materials, but when wet clay was encountered it packed so tightly in the bins that it would not pass through the openings in the bottoms without considerable ramming and shoveling by the men from the top. In remedying this situation

Looking Out Over the Narrow-Gage Layout from the Unloading Dock

a double side-hinged trap door about 2 ft. by 2 ft. in area was provided in the face of each bin close to the bottom. When loose material is encountered, a bar is removed and the doors are swung open by the weight of the material above, which then falls to the aprons or which can easily be made to fall by simply picking at it from below. When the correct amount of material has passed to the cars beneath, these doors are closed by hand and secured in position so that the bins can again be loaded to capacity.

When first constructed the unloading dock was not enclosed, but when cold weather approached, the entire structure, except at the ends, was entirely closed in with plank siding and covered by a plank roof. Within this shelter the men in the loaded cars assisting or prying the material through the hopper bottoms were entirely protected against inclement weather as were also the men loading the narrow gage cars below. The wisdom of enclosing the trestle is made apparent by the fact that since this step was taken not a day has been lost in carrying on the work due to rain, snow, or the cold.

Narrow-gage Equipment Carried Material to the Fill

The narrow-gage cars used in carrying the material from the unloading dock to the embankment are of four-yard capacity and are capable of dumping either to the side or over the end. These cars are usually hauled in four-car trains, pulled by seven-ton gasoline-operated contractor's locomotives. Throughout the work three such narrow-gage material trains have generally been in operation.

In actually placing the material in the fill, which was made for double track, two narrow-gage tracks were run out and the material was dumped over the sides and end of the fill. As the embankment was in some places as wide as 360 ft. at the base, this necessitated continual shifting of the tracks and the leveling off of the material as it was dumped. Shortly after the work was started, therefore, this arrangement was discontinued and the two tracks were spread apart and connected at their outer ends by a loop with a radius of about 45 ft., made of curved rails. With this loop at the end of the new em-

bankment as it was being carried across the valley, the loaded material cars were run out and dumped over the end of the embankment, building it up uniformly over the entire width of the fill as the work progressed, the width at this elevation being 104 ft. When the embankment had been built out a few feet, short sections of rail were put in the straight track on either side just behind the curved rails, which were then moved out on that portion of the embankment just completed. In this manner with the tracks so arranged that return trains could occupy either side of the unloading dock, practically the entire work was carried out, the new fill across the ravine being built at the elevation of the narrow-gage tracks beneath the dock, about 29 ft. below sub-grade. When nearing the opposite side of the ravine, the tracks were built on an incline to meet the elevation of final sub-grade. When the embankment on this grade had been completed, the loop track at the end was dispensed with and filling progressed in the opposite direction, toward the trestle, by dumping directly on the filll and raising

The Steaming Arrangement When Frozen Carloads Were Thawed for Unloading

and shifting the tracks from place to place in order to keep the fill fairly level across the top. During the progress of the fill in dry weather, little difficulty was experienced with settlement, but during the rainy season it was often necessary to jack up the circle track at the end of the fill, as much as five feet. This was due, however, more to the bank sliding away than to settlement, the maximum settlement being about eight feet. Up to the middle of March of this year, when the gap across the valley was closed, approximately 1,250,000 cu. yd. of earth, rock, cinders and foundry refuse had been placed in the fill, this material having required the hauling and unloading of approximately 23,000 standard bottom-dump car loads ranging from 60 to 90 tons.

Novel Steaming Plant Thaws Material for Unloading

While much of the continuity and regularity with which the work at Ringtown has been carried out since the last method of filling was adopted, is due to enclosing the unloading dock in order to keep the men out of the weather, and to the fact that the men working out on the fill were provided with complete rubber suits during rains or storms, much of the credit is also due to the successful method employed of thawing out loaded cars during the winter which had become frozen in transit or while waiting to be unloaded. This method consisted of forcing four ¾-in. steam pipes down into the loaded cars, which was accomplished by building a platform, four cars in length, and about level with the tops of the cars, and extending a steam line along it from which 16 outlets were arranged at suitable intervals. From these outlets, 1-in. rubber hose connections were made to pieces of ¾-in. pipe which were forced down into the frozen material in the cars until within a few inches of the bottom. With this arrangement little difficulty was experienced in placing the steam pipes in the cars as material through which they were forced was quickly thawed and blown aside as the pipes were pressed downward. Permeating through the frozen material, all of the steam was effectively used in thawing it out and also in heating around the bottom of the cars so that the hopper doors could be opened with little difficulty. With this steaming plant accommodating four cars at a time, the same number that could be unloaded simultaneously at the unloading dock, solidly frozen cars of cinders were thawed in approximately one-half hour, while frozen clay and other compact materials often required steaming as long as 1½ hours. All of the work at this plant was handled by two men, the steam being supplied by a locomotive which was set on a siding close to the steaming platform.

Filling Requires Building of Two Large Culverts

The only masonry work in connection with the fill at Ringtown included a reinforced concrete box road-culvert about 1,000 ft. from the south end of the alinement change, and a large arch waterway-culvert at the lowest point in the valley to permit the passage of Catawissa creek under the new embankment. The more important of these structures was the waterway arch which had to be designed to support the weight of the embankment, which extended about 92 ft. over it. This arch, which is parabolic in shape, and which is founded on solid rock, 19 ft. below the surface, has a total length, including wing walls, of about 385 ft. Within the arch there is a vertical clearance of about 25 ft. above the water level and a maximum side clearance of 45 ft. The over-all spread between the outside faces of the arch at its foundation is approximately 76 ft., which gives some idea of the large amount of masonry which was used in its construction.

The concrete roadway culvert under the south end of the fill, which necessitated a change in the location of a public road which formerly crossed through the center of the valley, is a reinforced concrete box structure, 56 ft. long exclusive of wing walls, 24 ft. wide, and providing 14-ft. vertical clearance between the roadway surface and the roof slab. Fortunately it was possible to place this opening at one of the shallowest places in the fill.

At the present time, the work at Ringtown is practically completed although the last 20 ft. or more of the fill is being made for a single track rather than for double track in order to put the new line in service as soon as possible. With the work so far advanced, it is planned within a short time to dismantle the unloading dock at this point and move it to Mainville where similar filling operations will be carried out. The work at Ringtown will then be finished by dumping direct from standard hopper-bottom cars and gradually raising the track to final sub-grade. The last four feet of the fill will be made with a good quality of locomotive cinders in order to provide a substantial and well drained roadbed.

Work at Mainville Constitutes Another Large Project

At Mainville the problem presented is similar to that at Ringtown, it being the plan to eliminate a long 11-deg. 25-min. curve, a 12-deg. 2-min. curve, and the 720-ft. steel viaduct at this point by a change in aline-

ment which will require the construction of a long high fill on a uniform curve of 6 deg. 50 min. This fill, which will be approximately 2,000 ft. in length and of a maximum height of about 110 ft., will involve the placing of about 360,000 cu. yd. of material, and as at Ringtown, will involve the changing of a public road with provision for an underpass through the fill, and the construction of a long reinforced concrete arch to carry the water of a tributary to Catawissa creek. The construction of the arch, as well as the change in the public highway, is now under way.

When all of this work has been completed the Reading will have eliminated approximately 4,900 ft. of high viaducts on its Catawissa branch, in addition to improving the alinement of its track at Ringtown and Mainville, this work having involved the handling of a total of approximately 3,000,000 cu. yd. of filling material.

All of the engineering work on this extensive project to date has been planned and carried out by the forces of the Reading under the direction of Samuel T. Wagner, who until January 1 of this year was chief engineer; Clark Dillenbeck, now chief engineer; P. S. Baker, engineer of bridges, and E. F. Gorman, resident engineer. All of the filling of the five viaducts before the Ringtown work was started, was carried out by the roadway forces of the Reading while the construction of culverts in connection with these fills was done under contract, as was also the placing of the concrete reinforcing of the viaduct towers at Fishers. All of the filling at Ringtown has also been done under contract, the work since April, 1924, when the successful method of filling was finally adopted, having been carried forward by the Campion Construction Co., Mahanoy City, Pa., under the direction of J. J. Leahy, superintendent of construction.

Arbitrating Wage Demands of Southeastern Firemen

WASHINGTON, D. C.

THE hearing on the wage increases asked by the Brotherhood of Locomotive Firemen & Enginemen for firemen, helpers, hostlers and outside hostlers employed on the principal railways of the Southeast except the Southern, Seaboard Air Line and Gulf, Mobile & Northern, was begun on May 17 before a board of arbitration consisting of Grafton Green, chief justice of the supreme court of Tennessee, selected by the Board of Mediation, W. J. Jenks, vice-president of the Norfolk & Western, selected by the carriers, and C. J. Goff, vice-president of the Brotherhood, representing the employees. The hearing was held in the conference room of the House office building.

The general increase asked is $1 a day for men employed on locomotives up to 250,000 pounds on drivers and an additional increase of 25 cents a day for each additional 50,000 pounds. The employees also ask a rule that weight on all other power-driven wheels shall be added to the weight on drivers of locomotives equipped with boosters and that the weights produced by such increase shall fix the rates to be paid for the respective services.

The railroads are represented at the hearing by a Conference Committee of Managers, of which P. R. Albright, vice-president and general manager of the Atlantic Coast Line, is chairman, and W. A. Northcutt, general solicitor of the Louisville & Nashville, is counsel, the brotherhood is represented by D. B. Robertson, president, S. A. Boone, vice-president, and Donald R. Richberg, counsel.

Mr. Richberg, in an opening statement, said that no request for a percentage wage increase was being made because there has never been established a rate of pay for firemen which could be taken as a just basis to which a percentage could be applied to represent changed conditions. He took the position that for twenty years or more back the locomotive firemen, "by every standard by which their wages can be tested, have been an underpaid group," and said that "to attempt to show what a proper wage would be today we have got to build from the ground up." He pointed out that this is the first arbitration of firemen's wages in the Southeast and declared that it would be shown that over a series of years the locomotive firemen have received an actually decreasing reward for their service as compared with the rewards received by others in their communities, while their employers have been receiving an increased product. "When we face the question of how much the employees should receive as compensation," he said, "we are facing a question of competition between the managers, representing the owners of the properties, and the employees."

Mr. Robertson appeared as the first witness and was followed by a number of firemen who told of their individual experiences. He explained the terms of the request, saying it would increase the minimum rate of $4.56 a day to $5.56, while the rates would range up to a maximum of $7.91 for locomotives of 550,000 pounds and over. He then went into a detailed description of the work of the fireman, to show the nature of the work and the qualifications required, saying there has been a gradual increase in the amount of work performed on the larger engine "which just about corresponds with the increase in the size of them." He filed with the board many photographs of locomotives and statistics and extracts from technical articles, some of them from the *Railway Age*, to show the increased size and tractive power of locomotives.

Mr. Robertson also laid great stress on the decreased opportunities for promotion of firemen, saying that when a firemen entered the service twenty years ago he could look forward in anticipation of being promoted to engineer in four or five or six years but that with the increase in the size of locomotives, "promotion has gradually slowed down until today it is a question of whether or not, on some railroads, we are even being promoted at all, because the record shows all over this country that the locomotive firemen who have been in service for years are now out of jobs entirely as locomotive firemen, and there are some cases where men who have been promoted to the position of engineer several years ago are cut off the firemen's working list, and cannot, by their seniority, even hold a job as fireman." "As a fireman's organization," he said, "we see the effects of it by having thousands of men on the streets out of jobs today when the railroads are doing the greatest business in their history."

IN ASKING PERMISSION of the Idaho Public Utilities Commission to abandon passenger service on the line between Bell, Wash., and Amwaco, Idaho, 14 miles, the Oregon-Washington Railroad & Navigation Company reported that the gross passenger revenue from daily service during the seven months' period ending in February, 1927, had been $2, resulting from the transportation of two passengers.

Interest in the Fuel Association's Convention Increasing

Attendance of over 2,000 an indication of the broadening scope of the Association's activities—Additional addresses and reports

So many factors are involved in the conservation of railway fuel that the energies of practically the entire operating and mechanical departments are being directed at times toward this important problem. This interest was well indicated by the increasing numbers of operating department men among those in attendance at the nineteenth annual convention of the International Railway Fuel Association held at the Hotel Sherman, Chicago, May 10 to 13, inclusive. Some of the outstanding addresses delivered at the early sessions of the meeting were presented in last week's issue of the *Railway Age*. In this issue are given abstracts or summaries of some of the later reports and addresses as well as the election of officers for the coming year, which took place at the closing session Friday, May 13.

New Officers

The officers who were elected to serve during 1927-28 are as follows: president, J. E. Davenport, division superintendent N. Y. C.; vice-presidents: C. H. Dyson, assistant fuel agent, B. & O.; T. C. Hudson, assistant general superintendent motive power, Can. Nat., and W. J. Tapp, fuel supervisor, D. & R. G. W. Elections to the executive committee were as follows: W. G. Black, mechanical assistant to the president, Erie; J. D. Clark, fuel supervisor, C. & O.; H. Morris, superintendent fuel and locomotive performance, C. R. R. of N. J.; J. M. Nicholson, fuel conservation engineer, A. T. & S. F.; C. T. Winkless, fuel agent, C. R. I. & P.

The 1928 convention will be held at Chicago during May, the exact date to be announced later

Summaries of the addresses by N. D. Ballantine, assistant to president, Seaboard Air Line; E. E. Regan, general superintendent, New York, New Haven & Hartford and A. E. Warren, general manager, Central Region, Canadian National, are presented below together with abstracts of several of the committee reports which were presented.

Fuel Fundamentals

N. D. Ballantine, assistant to the president, Seaboard Air Line, in an address on "Fuel Fundamentals" made a strong appeal to the Association for some action which will ultimately lead to the development of unbiased scientific facts relating to locomotive operation and fuel economy. His address carried the suggestion that statistics used at present as measures of relative railroad fuel efficiency do not recognize certain fundamentals which at times seriously affect their accuracy. At the outset, Mr. Ballantine said, "For a comparison let us take 1926 versus 1920, the end of federal control. Class I roads added about $3,800,000,000, or 19 per cent, to their property account in the six years. They lost 24.3 per cent of their passenger traffic and 25.8 per cent of their highest class freight traffic (less than carload freight). Further, the comparison shows for revenue freight an increase of but 6.4 per cent in tons originated and 7.7 per cent in tons one mile. For the same years it shows non-revenue (company ton-miles) increased 13.8 per cent and gross ton-miles increased 20.1 per cent.

"Fuel, being the largest single item in transportation expense aside from wages, should properly have first attention. It offers a fertile field for the application of scientific assembling and usage of relevant facts. The average cost of fuel in 1926 was $2.36 per ton, or 37.4 per cent less than in 1920. Each ton purchased probably averaged five to eight per cent more B.t.u. than the ton purchased in 1920. This tends to reduce the pound of coal required per ton mile. The reason for this is that in 1920 there were 50 per cent more mines operating than in 1926; competition is now keener; a larger proportion of the coal is machine mined and it carries less foreign matter. There was a decrease of 21.3 per cent in lb. of coal per gross ton mile in 1926 versus 1920. Who can properly say that this is or is not an evidence of efficiency?"

As some of the more important fundamental factors the speaker cited the effects of seasonal fuel requirements, relation of empty to loaded freight car mileage, number of locomotives in service, locomotive capacity, locomotive appliances and locomotive utilization. Speaking on seasonal fuel requirements it was pointed out that the months of June, July and August are regularly the months requiring less fuel to move a ton one mile. Using this summer season as a basis, September, October and November regularly require about 9 per cent more fuel, March, April and May about 14 per cent more and December, January and February about 26 per cent more than during the summer season. Also that, regardless of the decreasing amount of coal used per unit of service each year, this seasonal relationship has held true which bears out the conclusion that it must be a fundamental factor. As an example of the effect of this one factor, Mr. Ballantine said, "If, by reason of a coal strike in England, there should be a very much larger portion of the year's gross tonnage handled in the months of December, January and February, all other factors remaining the same, it would increase the yearly average lb. of coal per gross ton mile and with no reflection on your efficiency in fuel consumption.

"If the correct relations are known the net effect upon the year's performance can be reliably shown. On the other hand, if this increased movement referred to took place in June, July and August, it would tend to reduce the lb. of coal per ton-mile for the year, and unless analyzed might easily and erroneously be construed as an increase in efficiency."

With relation of empty to loaded car mileage as a

factor in fuel consumption, the speaker cited the fact that in 1926 for each 100 loaded car miles there were 57 empty car miles, which amounted to 9.7 per cent more empty car miles than in 1920, or an increase of 20.5 per cent. As an example of the operation of this factor it was cited that on level tangent track the resistance per ton of an empty 20-ton car is 133 per cent greater than for a loaded car weighing 70 tons. As the grades increase this percentage becomes less. With this in mind it was suggested that it is not difficult to see how an increase of 20.5 per cent in the relation of empties to loads must detrimentally affect fuel performance. Mr. Ballantine suggested that those responsible for fuel conservation were doing themselves an injustice if they failed to point out to their respective managers how adversely this fact affects efforts to save fuel. The result affects it two ways: First, in having to haul the additional tonnage, and second, to increase the pound of coal per gross ton-mile by decreasing the average weight of units moved. In dealing with the fundamental of locomotive capacity Mr. Ballantine said, "The tractive force averaged five per cent greater per locomotive and aggregated 19.9 per cent more during the month of October, 1926, than in 1920. Restricting the movement of company freight during the month of peak demand offers a field in which fuel and other economies can be effected." Mr. Ballantine gave great credit to the manufacturers of locomotive economy devices for virtually forcing the railroads into greater economy through the use of improved equipment. Considering the more intensive utilization of motive power through increase in train speeds and ton-miles per train hour, it was pointed out that certain of these factors will tend to increase the fuel consumption, other factors remaining the same, but, in speaking of a 15.5 per cent increase in freight train speeds in 1926 over 1920, should this be due to less density of traffic or more adequate road facilities such as passing tracks, block signals, etc., then there should be a substantial reduction in fuel, as the elimination of delays warrants heavier trains and heavier trains make for lower fuel requirements per ton-mile. Mr. Ballantine pointed out that "there was a decreased consumption of 21.3 per cent in fuel used per ton-mile which is a very substantial saving, but how much of it is due to the $3,800,000,000 added investment is rather difficult to say in the light of so many missing vital factors. In other words, we have 19 per cent more invested in railroad properties to handle 7.7 per cent more revenue freight.

"Here we have two factors working in opposite directions and as both have an important bearing upon the unit consumption, a wide range of surmises can be made but nothing definite agreed upon. Clearly then we have need to know which element is involved to say whether to debit or credit fuel consumption."

Certain other fundamentals such as the increase of sleeping, parlor and dining car mileage in relation to total passenger car mileage; installation of block signals; telephone dispatching; extended runs; equalization of tonnage and density of traffic all have a tendency to affect fuel consumption in one way or another. In conclusion Mr. Ballantine said, "I doubt if there is a railroad today which is currently analyzing or knows with reasonable accuracy what class of locomotives are really the most efficient for a particular division, or what bearing the efforts of you practical men have really had in reducing the amount of fuel per unit of service."

The Train Dispatcher and Fuel Conservation

That the train dispatcher is one of the most important factors in the fuel campaign was the opinion expressed by E. E. Regan, general superintendent, New York, New Haven & Hartford. The speaker reviewed the mechanical improvements which have been made to steam locomotives during the past few years, practically all of which have contributed in some measure to fuel economy. This then, has provided the operating department with motive power capable of being operated at the highest degree of efficiency. He then pointed out that in the utilization of this power a lack of intelligent handling may offset all of the savings which mechanical ingenuity has made possible. In directing attention to the strategic position of the train dispatchers in this work Mr. Regan said: "The chief dispatchers usually make up the working time table schedules under which the trains are operated and these schedules are the result of long experience in what the traffic requirements demand and what the physical characteristics of the railroad will permit. Any extra service that is needed to take care of the business should also be under his guidance and control. On some railroads the yardmaster or terminal trainmaster is permitted to call extra crews to move trains as the business or conditions in the terminal deem expedient and no consideration is given to the traffic conditions that might be encountered enroute which often results in heavy delays to either this extra or the regular traffic. The chief dispatcher can better determine the boarding time of the extra service, whereby the terminal would not suffer by holding the cars a few extra hours and whereby there would be no road delay to the trains.

The trick dispatcher working his regular district day after day comes into close contact with the yardmasters, the station operators, the train and engine crews and acquires knowledge of the abilities of these various fellow employees, all of whom need to co-operate with the dispatcher so that he can plan out the movement of each train with the minimum delay or interference to the rest of the service.

"The dispatcher soon learns when he can depend upon to move the tonnage train, drop or pick up cars at local stations with least delay, go the limit without water stops and make uniform good runs over the division. The train and engine crews soon learn that they have the regular dispatcher working, planning their meets and doing his part in helping them over the road. The yardmaster soon learns that the good dispatcher is as anxious to move his cars out of the yard, as he is for the yardmaster to take his trains in off the road. When this feeling of team work is installed and established on a division, stops and delays are eliminated, overtime is greatly reduced and the consumption of coal per gross ton-mile is likewise reduced.

"Train and engine crews working day after day with a dispatcher become inbued to a great extent with his spirit and are ready to work with him on the same basis that he works with them. If orders are always ready for them they do their best to make good, expecting criticism if they fail to do so and they will exert themselves to help out in a tight place. On the other hand, a crew that always has to wait for orders naturally falls into the don't care attitude and works along those lines. The train dispatcher, being the actual supervising official with whom all the men on the road come in contact, undoubtedly has the opportunity in his daily work to do more than any other man to get 100 per cent efficiency from these employees.

"Stops and delays, both at the originating point and

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So many factors are involved in the conservation of railway fuel that the energies of practically the entire operating and mechanical departments are being directed at times toward this important problem. This interest was well indicated by the increasing numbers of operating department men among those in attendance at the nineteenth annual convention of the International Railway Fuel Association held at the Hotel Sherman, Chicago, May 10 to 13, inclusive. Some of the outstanding addresses delivered at the early sessions of the meeting were presented in last week's issue of the *Railway Age*. In this issue are given abstracts or summaries of some of the later reports and addresses as well as the election of officers for the coming year, which took place at the closing session Friday, May 13.

New Officers

The officers who were elected to serve during 1927-28 are as follows: president, J. E. Davenport, division superintendent N. Y. C.; vice-presidents: C. H. Dyson, assistant fuel agent, B. & O.; T. C. Hudson, assistant general superintendent motive power, Can. Nat., and W. J. Tapp, fuel supervisor, D. & R. G. W. Elections to the executive committee were as follows: W. G. Black, mechanical assistant to the president, Erie; J. D. Clark, fuel supervisor, C. & O.; H. Morris, superintendent fuel and locomotive performance, C. R. R. of N. J.; J. M. Nicholson, fuel conservation engineer, A. T. & S. F.; C. T. Winkless, fuel agent, C. R. I. & P.

The 1928 convention will be held at Chicago during May, the exact date to be announced later

Summaries of the addresses by N. D. Ballantine, assistant to president, Seaboard Air Line; E. E. Regan, general superintendent, New York, New Haven & Hartford and A. E. Warren, general manager, Central Region, Canadian National, are presented below together with abstracts of several of the committee reports which were presented.

Fuel Fundamentals

N. D. Ballantine, assistant to the president, Seaboard Air Line, in an address on "Fuel Fundamentals" made a strong appeal to the Association for some action which will ultimately lead to the development of unbiased scientific facts relating to locomotive operation and fuel economy. His address carried the suggestion that statistics used at present as measures of relative railroad fuel efficiency do not recognize certain fundamentals which at times seriously affect their accuracy. At the outset, Mr. Ballantine said, "For a comparison let us take 1926 versus 1920, the end of federal control. Class I roads added about $3,800,000,000, or 19 per cent, to their property account in the six years. They lost 24.3 per cent of their passenger traffic and 25.8 per cent of their highest class freight traffic (less than carload freight). Further, the comparison shows for revenue freight an increase of but 6.4 per cent in tons originated and 7.7 per cent in tons one mile. For the same years it shows non-revenue (company ton-miles) increased 13.8 per cent and gross ton-miles increased 20.1 per cent.

"Fuel, being the largest single item in transportation expense aside from wages, should properly have first attention. It offers a fertile field for the application of scientific assembling and usage of relevant facts. The average cost of fuel in 1926 was $2.36 per ton, or 37.4 per cent less than in 1920. Each ton purchased probably averaged five to eight per cent more B.t.u. than the ton purchased in 1920. This tends to reduce the pound of coal required per ton mile. The reason for this is that in 1920 there were 50 per cent more mines operating than in 1926; competition is now keener; a larger proportion of the coal is machine mined and it carries less foreign matter. There was a decrease of 21.3 per cent in lb. of coal per gross ton mile in 1926 versus 1920. Who can properly say that this is or is not an evidence of efficiency?"

As some of the more important fundamental factors the speaker cited the effects of seasonal fuel requirements, relation of empty to loaded freight car mileage, number of locomotives in service, locomotive capacity, locomotive appliances and locomotive utilization. Speaking on seasonal fuel requirements it was pointed out that the months of June, July and August are regularly the months requiring less fuel to move a ton one mile. Using this summer season as a basis, September, October and November regularly require about 9 per cent more fuel, March, April and May about 14 per cent more and December, January and February about 26 per cent more than during the summer season. Also that, regardless of the decreasing amount of coal used per unit of service each year, this seasonal relationship has held true which bears out the conclusion that it must be a fundamental factor. As an example of the effect of this one factor, Mr. Ballantine said, "If, by reason of a coal strike in England, there should be a very much larger portion of the year's gross tonnage handled in the months of December, January and February, all other factors remaining the same, it would increase the yearly average lb. of coal per gross ton mile and with no reflection on your efficiency in fuel consumption.

"If the correct relations are known the net effect upon the year's performance can be reliably shown. On the other hand, if this increased movement referred to took place in June, July and August, it would tend to reduce the lb. of coal per ton-mile for the year, and unless analyzed might easily and erroneously be construed as an increase in efficiency."

With relation of empty to loaded car mileage as a

factor in fuel consumption, the speaker cited the fact that in 1926 for each 100 loaded car miles there were 57 empty car miles, which amounted to 9.7 per cent more empty car miles than in 1920, or an increase of 20.5 per cent. As an example of the operation of this factor it was cited that on level tangent track the resistance per ton of an empty 20-ton car is 133 per cent greater than for a loaded car weighing 70 tons. As the grades increase this percentage becomes less. With this in mind it was suggested that it is not difficult to see how an increase of 20.5 per cent in the relation of empties to loads must detrimentally affect fuel performance. Mr. Ballantine suggested that those responsible for fuel conservation were doing themselves an injustice if they failed to point out to their respective managers how adversely this fact affects efforts to save fuel. The result affects it two ways: First, in having to haul the additional tonnage, and second, to increase the pound of coal per gross ton-mile by decreasing the average weight of units moved. In dealing with the fundamental of locomotive capacity Mr. Ballantine said, "The tractive force averaged five per cent greater per locomotive and aggregated 19.9 per cent more during the month of October, 1926, than in 1920. Restricting the movement of company freight during the month of peak demand offers a field in which fuel and other economies can be effected." Mr. Ballantine gave great credit to the manufacturers of locomotive economy devices for virtually forcing the railroads into greater economy through the use of improved equipment. Considering the more intensive utilization of motive power through increase in train speeds and ton-miles per train hour, it was pointed out that certain of these factors will tend to increase the fuel consumption, other factors remaining the same, but, in speaking of a 15.5 per cent increase in freight train speeds in 1926 over 1920, should this be due to less density of traffic or more adequate road facilities such as passing tracks, block signals, etc., then there should be a substantial reduction in fuel, as the elimination of delays warrants heavier trains and heavier trains make for lower fuel requirements per ton-mile. Mr. Ballantine pointed out that "there was a decreased consumption of 21.3 per cent in fuel used per ton-mile which is a very substantial saving, but how much of it is due to the $3,800,000,000 added investment is rather difficult to say in the light of so many missing vital factors. In other words, we have 19 per cent more invested in railroad properties to handle 7.7 per cent more revenue freight.

"Here we have two factors working in opposite directions and as both have an important bearing upon the unit consumption, a wide range of surmises can be made but nothing definite agreed upon. Clearly then we have need to know which element is involved to say whether to debit or credit fuel consumption."

Certain other fundamentals such as the increase of sleeping, parlor and dining car mileage in relation to total passenger car mileage; installation of block signals; telephone dispatching; extended runs; equalization of tonnage and density of traffic all have a tendency to affect fuel consumption in one way or another. In conclusion Mr. Ballantine said, "I doubt if there is a railroad today which is currently analyzing or knows with reasonable accuracy what class of locomotives are really the most efficient for a particular division, or what bearing the efforts of you practical men have really had in reducing the amount of fuel per unit of service."

The Train Dispatcher and Fuel Conservation

That the train dispatcher is one of the most important factors in the fuel campaign was the opinion expressed by E. E. Regan, general superintendent, New York, New Haven & Hartford. The speaker reviewed the mechanical improvements which have been made to steam locomotives during the past few years, practically all of which have contributed in some measure to fuel economy. This then, has provided the operating department with motive power capable of being operated at the highest degree of efficiency. He then pointed out that in the utilization of this power a lack of intelligent handling may offset all of the savings which mechanical ingenuity has made possible. In directing attention to the strategic position of the train dispatchers in this work Mr. Regan said: "The chief dispatchers usually make up the working time table schedules under which the trains are operated and these schedules are the result of long experience in what the traffic requirements demand and what the physical characteristics of the railroad will permit. Any extra service that is needed to take care of the business should also be under his guidance and control. On some railroads the yardmaster or terminal trainmaster is permitted to call extra crews to move trains as the business or conditions in the terminal deem expedient and no consideration is given to the traffic conditions that might be encountered enroute which often results in heavy delays to either this extra or the regular traffic. The chief dispatcher can better determine the boarding time of the extra service, whereby the terminal would not suffer by holding the cars a few extra hours and whereby there would be no road delay to the trains.

The trick dispatcher working his regular district day after day comes into close contact with the yardmasters, the station operators, the train and engine crews and acquires knowledge of the abilities of these various fellow employees, all of whom need to co-operate with the dispatcher so that he can plan out the movement of each train with the minimum delay or interference to the rest of the service.

"The dispatcher soon learns when he can depend upon to move the tonnage train, drop or pick up cars at local stations with least delay, go the limit without water stops and make uniform good runs over the division. The train and engine crews soon learn that they have the regular dispatcher working, planning their meets and doing his part in helping them over the road. The yardmaster soon learns that the good dispatcher is as anxious to move his cars out of the yard, as he is for the yardmaster to take his trains in off the road. When this feeling of team work is installed and established on a division, stops and delays are eliminated, overtime is greatly reduced and the consumption of coal per gross ton-mile is likewise reduced.

"Train and engine crews working day after day with a dispatcher become inbued to a great extent with his spirit and are ready to work with him on the same basis that he works with them. If orders are always ready for them they do their best to make good, expecting criticism if they fail to do so and they will exert themselves to help out in a tight place. On the other hand, a crew that always has to wait for orders naturally falls into the don't care attitude and works along those lines. The train dispatcher, being the actual supervising official with whom all the men on the road come in contact, undoubtedly has the opportunity in his daily work to do more than any other man to get 100 per cent efficiency from these employees.

"Stops and delays, both at the originating point and

enroute, are fuel consumers and can be reduced to a minimum by the dispatchers if they do not call crews until trains are ready. If the company does not care whether the crews leave the initial terminal on time, why should they exert themselves to get over the road? While this may not be the attitude of all crews, I think it is with the majority, so that getting a train started from its initial terminal on time is 50 per cent of the success of a good run.

"Another item of importance in moving trains promptly and in which the dispatcher can help is to insist that the yard forces have the train thoroughly inspected for defective equipment; i.e., heated journals, running gear, chipped wheels, etc., and determine that air lines are O.K. and brakes operative before scheduled departing time.

"After a tonnage train leaves the yard or enters a dispatching district, it becomes the dispatcher's duty to keep that train moving and to avoid the making of any unnecessary stops. He should inform himself, if the train is received from another dispatching district, where water was last obtained, how the train has been performing etc., and be governed thereby as to other trains. A dispatcher's experience should show him where a water stop is to be made and the unnessary stopping of a tonnage train at a water station possibly on account of a local freight ahead or because he thought the through train would require water, is inexcusable and soon lessens the enthusiasm of the men who are trying to get over the road.

"Another feature to be considered is the course of action to be taken where two tonnage trains are on sidings to allow passenger service to pass. In the majority of cases we find that the train farther advanced is allowed to follow the passenger train with the result that the second train arrives and is stopped on account of a block, when if the second train had been allowed to keep moving the stop to that train would have been avoided and the further delay to the first train would have been slight.

In other words, keep the moving train moving when practicable; thus promote fuel economy. "Consumption of coal today, if for no other reason than that coaling stations are 25 to 50 miles farther apart than they were some years ago, has impressed upon the dispatcher a conservation complex as deeply ingrained, if not more so, than upon a fuel supervisor or a purchasing agent."

Operating Factors in Fuel Efficiency

A. E. Warren, general manager, Central Region, Canadian National, in an address read by C. A. Moore, a general superintendent of that road, directed attention to the especial importance of fuel conservation to the Canadian National in view of the fact that a great part of the locomotive fuel for that system must come from the United States at a cost of from 75 to 90 per cent more than the average price paid by Class I railroads in this country. In commenting on this he said, "The consumption, therefore, of five and one-half million tons annually, has a most definite and serious effect upon our operating expenses. We have, however, succeeded in the last four years in reducing our coal consumption in pound per passenger train car-mile 9.5 per cent, and in pound per thousand gross ton-miles, 15.5 per cent. The replacement, where practicable, of branch line steam passenger trains by oil electric type cars has secured a fuel economy of approximately 50 per cent."

In speaking of the modern locomotive and enginehouse facilities Mr. Warren said, "Most of us realize that the steam locomotive of today with all its modern fuel saving devices and great tractive force has developed into one of the highest examples of mechanical engineering. It performs its work under conditions which, at their best are severe, due to restrictions placed upon the designer, by the necessity of keeping within certain limits of size controlled by the gage of the rail, stress on bridges and clearance of highways and overhead structures. It naturally follows that if we are to secure the best results from these super-class machines, they should be maintained in a high state of efficiency. To do this economically, we must have modern engine terminal facilities at the main engine houses; coaling stations and water spouts conveniently located with sufficient run around tracks so that switching and transfer locomotives requiring coal, or water only, may be handled without delay or interference with main line locomotives requiring more attention. These main engine houses should have labor saving equipment such as proper ash pits, washout and water filling system, modern wheel drop pits, movable cranes for handling heavy locomotive parts, and motor driven trucks to move material promptly. This does not mean that we should embark on a campaign for new engine houses, but when new buildings must be erected, these facilities naturally should go with them. In many cases we have found that extension of engine house back walls will take care of the situation and permit of the installation of modern appliances for handling the machines when under repairs.

"At our large engine terminals, we have installed motor drive to our air compressors and put in motor driven washout pumps. This has permitted us to close down the steam plant at these terminals during the Summer months, making a positive saving of fuel and labor cost."

In speaking of the importance of more attention being directed toward the problem of yard and terminal fuel Mr. Warren said, "The importance of the fuel consumed by yard locomotives is apparent from the fact that 20.3 per cent of our total locomotive fuel in 1926 was chargeable to yard operation. Yard plants should be studied to insure that the movement of all cars is continuous in the direction in which car is moving and that it receives the minimum number of handlings between arrival and departure.

Leads should be arranged in such a manner that switching operations are not held up while long freight trains are entering or leaving the yard. Auxiliary tracks such as repair tracks, scale tracks, caboose tracks, etc., should be conveniently arranged for their purpose. The greatest advantage possible should be taken of gravity, with lead and ladder tracks built at a higher elevation than body tracks. Terminal air testing plants are an important factor in avoiding delay and should be installed wherever possible. Terminal detention to road power is in the hands of yard forces and should be avoided by having trains switched a sufficient length of time in advance of the hour ordered so as to allow the car department to complete inspection. Yardmasters and car foremen should co-operate so that repair tracks will be switched at the noon hour, thus avoiding interruption to the car repairmen during working hours. Incoming trains should be yarded promptly and road engines released immediately after arrival.

"By co-ordination of the work of the various terminals on a division or district, much can be done to avoid un-

necessary switching. A definite scheme of train marshalling, with a view to a minimum number of handlings of cars by switch engines between loading and unloading points, will not only cut down the total switching necessary, but will speed up the movements of trains through terminals."

Report on Locomotive Economy Devices

The improved performance of a number of new locomotive designs recently tested reflects the combined effect of an aggregation of devices most of which have come into practical use on American locomotives since the advent of the feedwater heater.

A good example can be found in the performance of 15 locomotives of the 2-10-4 type with feedwater heaters, superheat for auxiliaries, boosters, rail-washers, thermic syphons, limited cut-off and designed for 250 lb. working pressure, enlarged grate area and four-wheel trailer trucks, compared under the same operating conditions with the performance of 36 locomotives of the 2-10-2 type, designed for a working pressure of 200 lb. and not equipped with the devices and features above referred to.

Both groups of locomotives have 63-in. drivers. The cylinders of the newer locomotives are 29 by 32 in., compared with 28 in. by 32 in. on the older locomotives. The new locomotives, designated as the Texas type, weigh 150 tons on the drivers compared with 133 tons weight on the drivers of the older locomotives.

The committee is indebted to the Texas & Pacific for the statistics in the table covering the operation of both groups of locomotives for the calendar year 1926.

nals is constantly rising until it is estimated by some roads to represent from 25 to 40 per cent of all locomotive fuel. During the past year the Grand Trunk Western and the Chesapeake & Ohio conducted experimental tests of direct steaming systems.

In the direct steaming systems locomotives are held under steam by direct connection to a high-pressure steam main from a stationary boiler plant and when the locomotive boiler is emptied in the enginehouse it is refilled with a mixture of hot water and steam which flows into the boiler until a working steam pressure has been developed without a fire on the grates. Provision is also made for salvaging surplus water that accumulates in the locomotive boiler while it is being steamed up or held under steam. With this system it is not necessary to light the fire on the grates until the locomotive is ready to leave the terminal and if it is desired to eliminate all fires in the enginehouse the locomotives are moved out under their own steam and placed on the ready track before the fires are ignited.

Under ordinary operating conditions at Battle Creek, the Grand Trunk Western has found this system to be the most practical means for smoke abatement at its Chicago enginehouse. The committee is advised that the

Comparison of the Fuel Consumption of Texas Type (2-10-4) and 2-10-2 Type Texas & Pacific Locomotives

	Marshall dist.		Longview dist.		Dallas dist.		Ft. Worth dist.		Baird dist.		All districts	
	Texas type	2-10-2 type	Texas type	2-10-2 type	Texas type	2-10-2 type	Texas type	2-10-2 type	Texas type	2-10-2 type	Texas type	2-10-2 type
Total mileage	8,542	33,811	3,529	133,766	90,367	331,525	191,237	203,581	168,653	67,341	462,328	770,024
Average tons per train mile	3,005	2,497	2,899	2,181	2,390	1,854	2,244	1,617	2,224	1,546	2,285	1,850
Per cent engine utility	62.6	73.4	85.3	82.3	79.7	84.3	78.1	78.9	67.4	65.8	73.9	80.3
Gallons oil per 1,000 g.t.m.	6.9	11.2	6.4	10.5	6.9	10.7	7.3	12.3	7.4	11.0	7.2	11.1
Per cent reduced fuel consumption	38.4	.....	39.0	....	35.5	....	40.6	....	32.7	....	35.1	....
Per cent increased train loading	20.4	.....	32.9	....	28.9	....	38.8	....	43.9	....	23.5	....

The difficulty of finding two such groups of locomotives operating under conditions that afford a valid comparison can be appreciated.

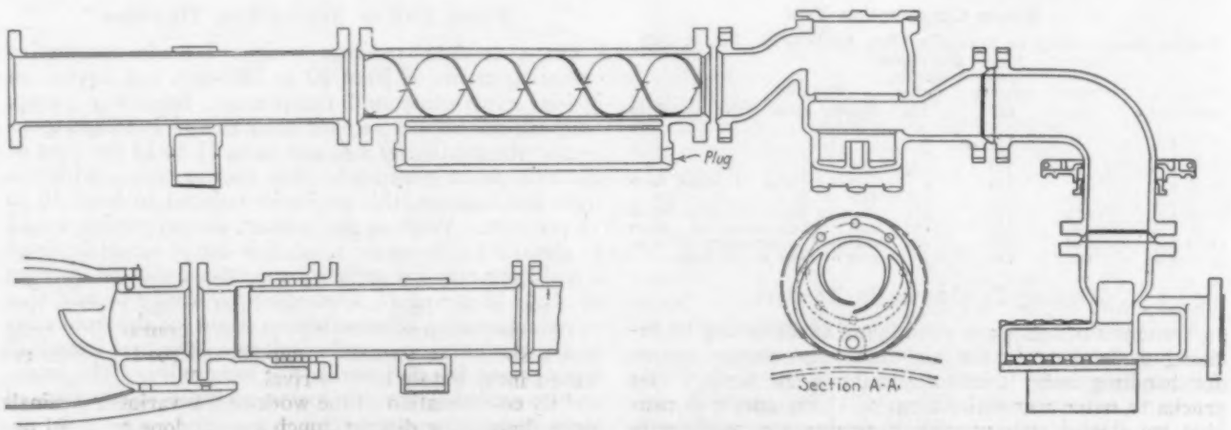
Direct Steaming—Locomotives at Terminals

The reason the committee has given attention to the problem of the direct steaming of locomotives at terminals is that the percentage of fuel consumed at terminals is constantly rising until it is estimated by some roads to represent from 25 to 40 per cent of all locomotive fuel. During the past year the Grand Trunk Western and the Chesapeake & Ohio conducted experimental tests of direct steaming systems.

In the direct steaming systems locomotives are held under steam by direct connection to a high-pressure steam main from a stationary boiler plant and when the locomotive boiler is emptied in the enginehouse it is refilled with a mixture of hot water and steam which flows into the boiler until a working steam pressure has been developed without a fire on the grates. Provision is also made for salvaging surplus water that accumulates in the locomotive boiler while it is being steamed up or held under steam. With this system it is not necessary to light the fire on the grates until the locomotive is ready to leave the terminal and if it is desired to eliminate all fires in the enginehouse the locomotives are moved out under their own steam and placed on the ready track before the fires are ignited.

Under ordinary operating conditions at Battle Creek, the Grand Trunk Western has found this system to be the most practical means for smoke abatement at its Chicago enginehouse. The committee is advised that the Chicago & North Western and the Big Four have completed plans for the installation of the direct steaming system on a large scale for the purpose of smoke abatement in enginehouses at Chicago and Cincinnati.

From the standpoint of fuel economy at the terminal the results depend upon the steam consumption required to steam up and hold locomotives under steam by means of stationary boilers in place of fuel burned on the



Outside Dry Pipe with a Spiral Steam Desaturator Applied to a K. C. S. Mallet Type Locomotive

grates while the locomotive is standing in the enginehouse.

In the tests referred to it was established that from 4,500 to 6,000 lb. of steam hour is the maximum requirement at the time the boiler is being refilled after being washed out or water changed, this figure being based on steaming an engine from empty to stationary boiler plant pressure in from one hour to one hour and twenty minutes. Provided more time can be allowed for filling and steaming the maximum steam consumption can be cut down in direct proportion to the time required to bring the engine up to maximum pressure.

Where the stationary boiler plant pressure is 150 lb. and it is desired to hold locomotives at a minimum of 125 lb. pressure, it has been found that a ½-in. by-pass at each direct steaming station permits sufficient steam flow to maintain this pressure, which represents a maximum demand upon the stationary boiler plant of 30 b.hp. per hour, it being understood that this takes care of ordinary fluctuations encountered. However, while it has been found that the maximum required for holding engines is at the rate of 30 b.hp. for each engine on the line, actual experiments show that if the stationary boiler pressure can be maintained at a fairly uniform rate, the hourly consumption per locomotive will average about 10 b.hp. per hour.

With an average stationary boiler plant coal consumption of 4½ lb. per boiler horsepower-hour, the fuel required to hold a locomotive under steam in the enginehouse by the direct steaming system is about 45 lb. of coal per hour. A further economy is possible where a cheaper grade of coal can be utilized in the stationary boilers than required for locomotive use. As has been stated in previous reports, the use of stack blowers in the enginehouse represents a steam consumption variously estimated at from 40 to 80 boiler horsepower per hour. With the direct steaming system the enginehouse blower is eliminated except for occasionally cooling down the boiler when necessary for work in the firebox.

Steam Consumption Test

Filling and steaming locomotive 5,039, Battle Creek Dec. 3, 1926

Time	Pressure steam at booster	Loco. gage pressure	Steam flow, lb. per hr.	Remarks
11:40 a.m.	115	0	5,250	Start to fill locomotive with water at temperature of 180 deg. and steam from boiler plant
11:55 a.m.	115	10	6,000	
12:04 p.m.	105	25	5,500	Close water line valve, one gage water in boiler
12:30 p.m.	115	62	5,500	
12:45 p.m.	117	80	5,000	
1:00 p.m.	125	95	3,750	
1:20 p.m.	125	120	3,000	Booster steam valve closed to ⅛ turn
1:45 p.m.	135	130	1,500	

Steam Consumption Test

Holding steam pressure on locomotive 5,039, Battle Creek, Dec. 4, 1926

Time	Boiler plant pressure	Loco. gage pressure	Wat'r glass reading inches	Remarks
8:30 a.m.	136	137	5¼	Booster steam valve closed to ⅛ turn
9:30 a.m.	135	135	6	
9:45 a.m.	140	132	6	
10:00 a.m.	125	127	5¾	
10:15 a.m.	135	130	6	Note: Rise of water from 5¼ in. to 7 in. above crown sheet in locomotive 5,039 represents condensation of steam delivered to locomotive boiler at rate of 189.4 lb. per hour.
10:30 a.m.	145	132	6½	
10:45 a.m.	135	131	6¼	
11:00 a.m.	140	132	6½	
11:15 a.m.	140	133	6¾	
11:40 a.m.	140	134	7	

Heating Feedwater in Tenders

A number of roads are obtaining a small saving by reclaiming the heat in the air pump and stoker engine exhaust by passing it into the water in the tender. To prevent overheating some form of thermometer is provided and when the maximum temperature desired is reached, the exhaust is turned into the stack. The equipment required can be applied to an engine with small cost and with little subsequent maintenance.

The report contained descriptions of the equipment used by the Union Pacific and Boston & Maine for heating feedwater in tenders.

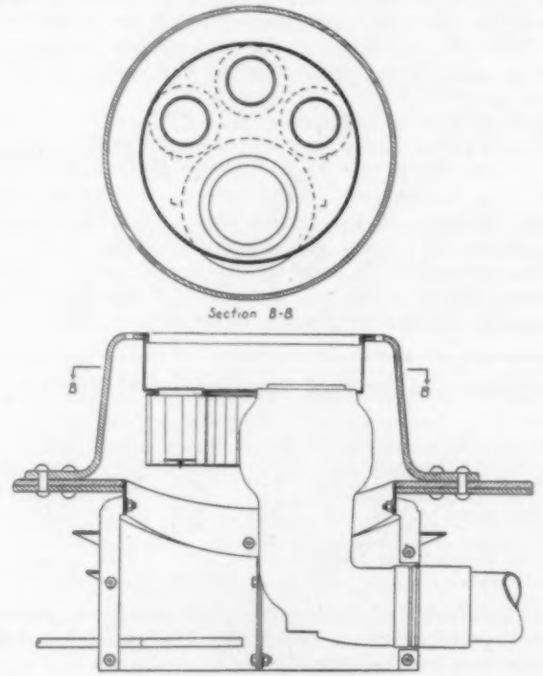
A number of test runs have been made with the B. & M. equipment and the results of two runs in May, 1926, are given in the table:

Results of Tender Feedwater Heating on the B. & M.

	Run No. 1	Run No. 2
Tank water temperature	49½ deg.	47 deg.
Temperature of atmosphere	61 deg.	65 deg.
Temperature of suction water	*118.4 deg.	107.7 deg.
Boiler pressure average	179 lb.	172.6 lb.
Back pressure on compressor	3.6 lb.	4 lb.
Average water used per hour	16,740 lb.	15,160 lb.

* Temperature considered too high for positive operation of lifting injector.

Heating the water in the tank results in a saving of from three to four per cent of the fuel used by the locomotive. While this is small, the saving undoubtedly justifies the cost.



Application of Centrifix Steam Desaturating Units to a Locomotive Steam Dome

Front End or Smoke Box Throttles

On a modern medium weight Mikado locomotive operating trains of from 90 to 110 cars, and having an 8½-in. cross-compound compressor, feedwater pump, long cut-off booster, stoker engine, and headlight generator, the auxiliaries will use from 11 to 13 per cent of the total steam generated. For shorter trains, with less train line leakage, this might be reduced to from 10 to 12 per cent. Without the booster, the proportion would be about 7 to 10 per cent. A fair range would be from 7 to 13 per cent for ordinary conditions with an average of about 10 per cent. Consequently, it may be said that in general the use of superheated steam for the auxiliaries of a steam locomotive will result in a saving of from 2 to 4 per cent of the fuel used by the locomotive. The front-end or smokebox throttle makes such use of superheated steam possible and convenient.

The report continued with a description of the multiple

front-end throttle which was described on page 1793 in the June 14, 1926, daily edition of the *Railway Age*.

Locomotive Steam Desaturators

The use of steam desaturators appears to offer an undeveloped field for further improvement in locomotive performance. Furthermore, the trend toward larger locomotive boilers and increased boiler capacity is increasing rather than diminishing the need for practical means to prevent carrying a high percentage of moisture over with the steam to the superheater units and even into the cylinders.

The introduction of baffling devices or other means for precipitating moisture from the steam as it is drawn from the steam space to the superheater units presents a difficult problem in locomotive construction, aside from additional weight and expense of such apparatus, for the reason that unless an outside dry pipe is used, the desaturator must be positioned inside of the boiler. This is objectionable unless it is readily accessible for inspection and maintenance.

In this connection, the attention of the committee has been called to the advantages of an outside dry pipe arrangement recently installed by the Kansas City Southern on some Mallet locomotives. This is not only adapted to the installation of a desaturator in the dry pipe outside the boiler as illustrated in the drawing, but is claimed to effect an obvious reduction in locomotive maintenance through elimination of the joint between the dry pipe and front flue sheet.

The desaturator employed is constructed in the nature of a spiral which causes the steam to whirl rapidly as it is drawn through the desaturator. This has a tendency to throw all moisture particles to the outer wall where the water is caught by a groove, collected and returned to the boiler.

In the design and application of this desaturator attention was given to such detail features as the joint between the condensate return pipe and the boiler. The outside steam pipe and the desaturator requires thorough lagging to prevent additional condensation but, as installed, this device is readily accessible for inspection and can be easily removed and replaced without adding materially to the weight of the locomotive.

No tests have been made to determine the reduction in moisture content of the steam, but it has been ascertained that there is no appreciable pressure drop in the steam flowing through this device. It is understood that some additional locomotives are being equipped with outside dry pipes and spiral desaturators as they go through the shops.

The Centrifix desaturator, which has quite wide use in stationary practice, has recently been applied to locomotives for test on several roads. This type of desaturator requires no important change in the construction of the locomotive, but can be installed in a steam dome of the conventional construction, by means of a pan which fits into the steam dome opening and rests on top of the throttle opening so as to separate the steam intake from the main steam space below the dome, and by inserting a number of Centrifix units in this plate. This is supplemented by a cylindrical apron supported from the dome opening in the boiler and suspended from this point down to within 3 in. of the top of the flues as shown in the illustration.

The Centrifix unit consists of a series of oblique blades that impart a violent whirling motion to steam drawn horizontally into the unit. This throws the moisture against the edges of these blades from which it is precipitated. The effect of the cylindrical apron is to create a steam pool below the units and prevent a surge of water in close proximity to the Centrifix and a consequent overloading of the units. Separate openings for the dry pipes to the auxiliary turrets are cut in the plate supporting the Centrifix units so that all steam drawn from above this plate is subject to this desaturating effect. The capacity of this device can be augmented by inserting additional units of the same size in the plate or by using standard units of larger dimensions. All units are constructed with Monel metal blades.

A test of the Centrifix desaturator recently conducted on a Pacific type locomotive improved the steam quality from 98.7 per cent without the desaturator to 99.6 per cent with the desaturator. This increase in quality of the steam was noticeable to the extent of about 10 deg. increase in superheat temperature.

Furthermore, it was found that in throwing out the water from the steam, all impurities were kept from the cylinders and the inside of the Centrifix pan was clean while the outside had accumulated quite a scale deposit. This clearly indicates that in addition to the direct effect of removing moisture from the steam and consequently improving the superheat, the desaturator lessens the progressive accumulation of scale in the superheater units and thus, in time, exerts a considerably greater influence upon superheat than reflected in an immediate comparison of temperatures as above given.

Under the subject of new valve gear development the report described the construction of and test data obtained from Caprotti poppet valve gear.

Mechanical Cut-off Control

With the advent of a three-pressure setting attachment for the cut-off control, no additional equipment has been added, nor the device complicated, nor redesigned. In fact, there has been eliminated all parts heretofore in the cab, namely, the foot valve, primary control valve, gage, panel and valves, the use of these parts or their equivalent being discontinued. In lieu thereof there is but one valve in the cab which the engineer may adjust manually to get any one of three pressure settings, the operation of the device, exclusive of this feature, being the same as those in service for the past three or four years.

The operating feature of three different back pressures has been a decided step in advance, inasmuch as it allows the engineer to set the device so that it may operate the locomotive to 100 per cent of its capacity, again to 75 per cent and again to 25 per cent, and the cut-off adjusted without further attention. The device may be set for other percentages than those referred to, depending on operating conditions.

Air Whistles for Locomotives

The increasing use of rail motor cars has led to the development of air-operated whistles of sufficient calibre for steam railway requirements and several roads are experimenting with this type of whistle on locomotives. A recent test on the Union Pacific indicates that there is a fuel saving from the use of air whistles in place of steam whistles of about $1.15 per locomotive per day in passenger service between Omaha and Cheyenne. On this road it is the practice to whistle for the operator's signal at each station and acknowledge the clear signal, but on the other hand the grade crossings for which the crossing signal must be blown are less frequent than in other sections where the fuel saving would consequently be greater.

The report was submitted by George E. Murray (Grand Trunk Western), chairman; E. A. Averill (Superheater Co.); J. N. Clark (S. P.); L. E. Dix (T. & P.); L. D. Freeman (C. & O.); A. G. Hoppe

(C. M. & St. P.); J. R. Jackson (M. P.); V. L. Jones (N. Y., N. H. & H.); Elmer Kuhn (N. Y. C. & St. L.); J. M. Lammedee (Worthington Pump & Machinery Corp.); G. H. Likert (U. P.); L. P. Michael (C. & N. W.); F. P. Pfahler (S. A. L.); L. G. Plant (Ry. Engineering Equipment Co.); W. A. Pownall (Wabash); H. W. Sefton (C. C. C. & St. L.); S. R. Tilbury (A. T. & S. F.), and G. A. Young (Purdue University).

Diesel Locomotives

The Committee on Diesel Locomotives presented a very complete report of the developments in the Diesel locomotive field during the past year. This report covers the developments in both this country and in Europe and gives considerable construction and test data on the more important locomotives. The last part of the report is devoted to a partial bibliography of articles on Diesel locomotives that have been published in the technical press. All of the Diesel locomotives in service in this country at the present time and all of this type of locomotive now on order from builders in this country use electric transmission.

The Baldwin Locomotive Works is building a second experimental 1000-hp. locomotive. This locomotive will use a Krupp six-cylinder four-cycle Diesel engine. The Ingersoll-Rand, General Electric and the American Locomotive companies are building an oil-electric locomotive with a six-cylinder, four-cycle engine rated at 750 hp. at 500 r.p.m. The McIntosh & Seymour, American Locomotive and General Electric companies are also building an oil-electric locomotive with a 12-cylinder, four-cycle engine rated at 960 hp. at 325 r.p.m.

Information Regarding Foreign Locomotives

The 1200-hp. Diesel locomotive with air transmission built by the locomotive firm Maschinenfabrik Esslingen, and described in last year's committee report, has been completed and we understand is at present undergoing tests on German State Railways. No data, however, is yet available.

The 1000-hp. Diesel locomotive with gear transmission built by the Hohenzollern Company at Dusseldorf, Germany, for Russia, was tested on a testing plant at Dusseldorf and on German roads, and sent to Russia under its own power. The tests showed that the consumption of fuel at full power amounted to only .49 lb. of oil per rail horsepower-hour, this corresponding to 29 per cent overall thermal efficiency of the locomotive. The efficiency of the 1000-hp. Russian Diesel locomotive with electric transmission, it will be recalled, was about 24 per cent.

Nydquist & Hohm, Trollhattan, Sweden, has built one 300 hp. Diesel hydraulic-drive locomotive for the Uddevalla-Vanersborg railway, but there are no operating figures for publication.

One 300-hp. Diesel electric locomotive built some years ago at Deva, Vasteras, Sweden, is now in regular service between Uppsala and Enkoping, about 28 miles, with twelve station stops. The weight of the train hauled is 102 tons. The fuel oil used is 1.2375 lb. per train mile, and the lubricating oil used is .0015 lb. per train mile.

One 160-200-hp. Diesel electric locomotive built by the same firm, has been in service since 1924 on the Skane-Smaland railway. The weight of the locomotive is 38 tons. The eight-cylinder Diesel-motor makes 500 r.p.m., and the locomotive is operated over a railroad having grades up to 1.67 per cent. The Diesel motor drives one generator furnishing direct current to two 65-hp. motors, each directly connected to one of the two driving axles.

During 1926 it has operated	166,564 miles
Weight of train	88 to 100 tons
Fuel oil used	.00075 lb. per ton mile
Diesel lubricating oil used	.00068 lb. per ton mile
Engine oil used	.00055 lb. per ton mile
During 1926 it has been in for general repairs	54 days
During 1926 it has been out of service for running repairs	17 days
During 1926 it has been out of service account too light to handle heavy train	1 day
During 1926 it has been in service	293 days

Mr. Rosen, a Swedish engineer, is still experimenting with his hydraulic transmission on the 300-hp. locomotive that was built in 1925, and which is still in regular service.

Diesel Locomotives in the United States

The report included a list of 19 Diesel-electric locomotives that are now being operated or are on order by railroads in the United States. The oldest locomotive shown in this list is the 60-ton oil-electric locomotive built by the Ingersoll-Rand, General Electric and the American Locomotive Companies for the Central of New Jersey, which was delivered in October, 1925. The report states that this list is complete except for several locomotives of special design. One eastern railroad included in the list has on order three Diesel engine-driven locomotives. These locomotives are of special design, as shown in Table I.

Table I—General Dimensions of Three Diesel Locomotives Now on Order for an Eastern Railroad

Service	Freight	Passenger	Switch
Wheel arrangement	4-8-4	4-8-4	0-4-4-0
Weight on drivers, lb.	164,000	180,000	250,000
Total weight of locomotive, lb.	290,880	348,000	250,000
Total length overall	51 feet 7 inches	59 feet 4 inches	46 feet 8 inches
Driving wheel base	17 feet 6 inches	18 feet 6 inches	{ 8 feet 3 inches { 34 feet 1 inch
Total wheel base	42 feet 10 inches	49 feet 4 inches	34 feet 1 inch
Maximum speed, m.p.h.	45	60	40
Maximum tractive force	41,000 lb.	45,000 lb.	62,500 lb.
Engine, cycle	4-stroke	4-stroke	4-stroke

Builder	Ingersoll-Rand	McIntosh & Seymour	Ingersoll-Rand
Brake horsepower	750	960	300
Revolutions per minute	500	325	600
Cylinders, diameter and stroke, in.	14¾ by 16	14 by 18	10 by 12
No. of cylinders	6	12	6
Weight of engine, lb.	45,000	80,000	20,125
Kind of fuel inj. system	Solid	Air	Solid
Main power generator, voltage	460	485	500
Storage batteries, type	E.S.B.Co.	E.S.B.Co.	E.S.B.Co.
Capacity	150 a.h.	150 a.h.	680 a.h.
Axle motors, number	4	4	4
Type	GE-286-A	GE-286-A	GE-286-A
Capacity	395 hp.	395 hp.	395 hp.

A second eastern railroad is now building in its own shops, three Diesel electric locomotives, the principal dimensions and data of which are as follows:

Type	0-4-4
Length over couplers	26 ft. 10½ in.
Wheel base	10 ft.
Wheel diameter	50 ft.
Weight	130,000 lb.
Tractive force	40,000 lb.
Oil engine	Bessemer 500 hp., 800 r.p.m., 4 cycle
Fuel injection	Solid
Cylinders	8, 8½ in. bore by 12 in. stroke
Main generators	Westinghouse 325-kw., 580 volts
Motors	2 Westinghouse, 225 hp. each
Gear ratio	16.76

A third eastern railroad has on order a Diesel locomotive which is now being built by Krupp in Germany, of which the general dimensions and data are given in Table II.

The committee sent a questionnaire to the different railroads operating Diesel locomotives requesting infor-

mation as to the cost of operation and maintenance and the kind of service rendered. All of the replies gave data on Diesel or oil-electric locomotives used in switching service only, which varied from light to heavy. Although the committee found it difficult to obtain comparable figures relative to operation or maintenance costs, the replies to the questionnaire did give a large amount of valuable information. The railroads replying to this questionnaire were designated by the letters A, B, C, etc., and the reports from some of these are shown in Tables III and IV.

Table II—Dimensions and General Data of the Diesel Geared Locomotive Built by the Friedrich Krupp Works, Essen, Germany

Type	4-8-4
Weight on drivers	200,000 lb.
Total weight	314,000 lb.
Wheel base, rigid	17 feet 0 inch
Wheel base, truck	6 feet 6 inches
Total wheel base	44 feet 1 inch
Diameter of driving wheels	61 inches
Tractive force at 7½ m.p.h.	50,000 lb.
Factor of adhesion	4
Maximum curve	16 deg.
Maximum speed	60 m.p.h.
Engine	Six cylinders, single acting, four-cycle, solid injection, not less than 1,300 b.h.p. at 470 r.p.m.
Transmission	Mechanical, 4-stage gear system

Table III—Service Record of One 60-Ton, 300-hp. Oil-Electric Locomotive Reported by Road "C"

Kind of service and operating conditions	Shifting and drag
Hours operating per day	23½ hr. each week day and 8 hr. on Sundays
Total hours per week	149
Cost of fuel oil, lubricating oil, gasoline, etc.	$1,703.23
Cost of maintenance	$2,036.78
Kw.-hours generated	31,056
Cost per kw.-hour generated	$0.1204
Hours of locomotive service	4,673
Cost per hour of locomotive service	$0.8003
Number calendar days out of service for inspection, repairs or material	20

Summary of Operation Oil-Electric Locomotive vs. Steam Locomotives It Replaced

Time	June 18, 1926, to Feb. 28, 1927	
Number of days	256	
Hours of locomotive service	4,673	
Total number miles at 6 m.p.h.	28,038	
	Oil-electric	Steam
Interest on investment—256 days	$2,567.01	$1,490.69
Depreciation	1,900.71	747.68
Crews' wages	6,261.82	7,086.45
Cost of fuel, oil, coal, etc.	1,703.23	4,808.52
Cost of maintenance	2,036.78	3,364.56
Total cost of operation	$14,469.55	$17,497.90
Total cost of operation per mile	$.515	$.624
Hourly operating average		
Interest on investment	$.550	$.319
Depreciation	.407	.160
Crews' wages	1.340	1.515
Cost of fuel, oil, coal, etc.	.364	1.029
Cost of maintenance	.435	.720
Total cost per hour	$3.096	$3.743

Saving in favor of oil-electric locomotive: $.647, or 17.3 per cent.

Last year's report indicated that for every dollar expended for fuel oil for the Diesel engine $.233 was spent for lubrication. The operating costs reported this year indicate that the cost for lubricating oil was about $.248 for every dollar expended for fuel oil.

Some means of filtering the lubricating oil should be provided on the locomotives to purify the oil and thus make it possible to extend the time between changes. This should materially reduce the cost of lubrication.

Table IV—Service Record of One 100-Ton, 600-hp. Oil-Electric Locomotive (Reported by Road "J")

Switching service. Operating conditions good.
During January operated 371 hours— 8 days worked three shifts
11 days worked two shifts
4 days worked one shift

Cost of fuel oil	$114.90
Cost of lubricating oil	30.30
Cost of gasoline, for starting engine	2.63
Cost of supplies	6.64
On all the above amounts there is a storage charge of 6 per cent.	
Cost of maintenance	$201.50
The cost of maintenance was high during January on account of changes that were being made at that time.	
Kw.-hours generated	24,700

Comparison Cost in Cents per Mile Run
(371 hours' service performed in January at 6 miles per hour in switching service, 2,226 miles.)

	Steam	Oil-electric
Fuel	40.00	5.17
Repairs	7.75	12.29
Wages	29.81	29.84
Enginehouse expense	8.86	5.43
Lubrication	.40	1.36
Other supplies	.82	.41
Total	87.73	54.50

The comparative cost per mile run is 33.23 cents in favor of the oil-electric locomotive.

	Locomotive	Oil-electric
Tractive force	58,500 lb.	60,000 lb.
Weight on drivers	232,600 lb.	209,500 lb.
Total weight engine and tender	375,500 lb.	209,500 lb.
Weight on drivers ÷ tractive force	3.98	3.47
Superheated	Yes	....

The report was signed by L. P. Michael, (C. & N. W.) chairman; E. J. Brennan, (C. G. W.), L. G. Coleman, (Ingersoll-Rand Company), Harte Cooke, (McIntosh-Seymour Company), J. E. Davenport, (N. Y. C.), R. M. Dilworth, (Electro-Motive Company), A. H. Ehle, (Baldwin Loco. Works), H. Gardner, (Steamotor Company), A. I. Lipetz, (American Locomotive Company), C. E. Lucke, (Columbia University), J. K. McNeillie, (D. & H.), R. J. Needham, (C. N.), J. M. Nicholson, (A. T. & S. F.), C. A. Norman, (Ohio State University), Clarence Roberts, (Penna.), F. E. Russell, (S. P.), C. B. Smith, (B. & M.), Carl Uddenberg, (Swedish Government Rys.), and W. H. Winterrowd, (Lima Locomotive Works).

Locomotive Coaling Stations

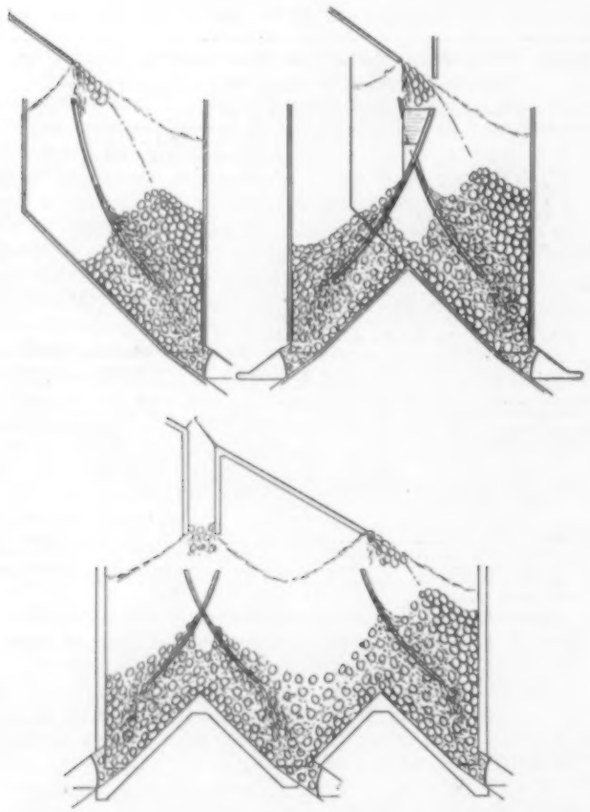
When run of mine or coal of mixed sizes is delivered to the storage bins of a fueling station, segregation of lumps and fine sizes will occur unless, by chance or design, the station has been built to prevent it. Discussion of this committee's report at previous conventions indicates that such separation is being given an increasing amount of recognition as having an important relation to fuel economy and successful firing; and this opinion, being confirmed by complaints from widely separated territories, leads this committee to feel that the time is appropriate to record the various means which have come to their attention for controlling conditions which cause this separation to take place.

A steam failure is often seen explained on the routine report as having been caused by a tender loaded with slack coal. This may lead to making a complaint to the mine operator for furnishing too much slack, or the fuel inspector being criticized for permitting such coal to be accepted; or, the investigation may go further and develop that the coal as shipped was satisfactory, but that fine sizes separated from the lumps when unloaded, and eventually as the coal moved out of the bin, the tender received a load of slack.

This should not be accepted as inevitable and recorded as an unavoidable failure. Those responsible for providing coal of the desired quality on tenders, and whose duty it is to rectify conditions giving complaint from the operating department due to the character of the fuel must acquaint themselves with the causes of segregation, and by a study of conditions at each station, be prepared to offer a suitable plan to modify or overcome the difficulty in existing stations, and by cooperation with those responsible for design to give suggestions which will prevent segregation in proposed new stations.

This committee has found that several roads have given consideration to this problem to the extent of making alterations in stations now in use; and companies building coaling stations have all devoted much study to the subject.

Where operating conditions will permit, it is advisable to keep the storage bins filled, as then even with the separation of sizes that takes place where no precautions are used to prevent it, there is a certain amount of remixing as the coal feeds out of the discharge gate to the tender. It is when the bin becomes almost empty and all the lumps at the sides have been fed out that a tender receives a load of slack. Keeping the storage bin filled has the further advantage of reducing breakage due to the smaller drop.

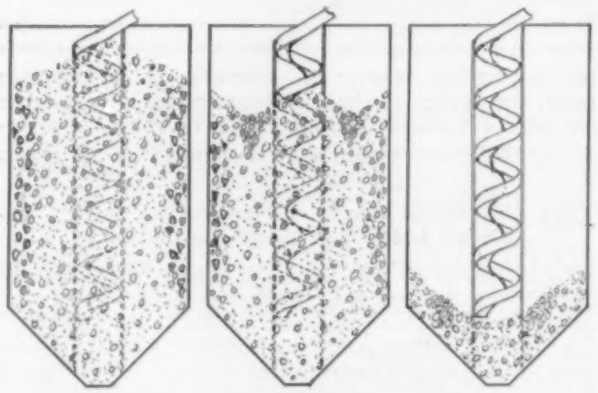


Method of Preventing Segregation of Coarse Coal from Slack Developed on the Chicago, Burlington & Quincy

Most of the methods described are simple and inexpensive to apply to existing fueling stations; and new stations may be designed to minimize the trouble with little or no increased cost to build.

Diagrams Used to Illustrate

[The report contained a number of diagrams illustrating the segregation of the coarser sizes of coal from the smaller. The two methods, shown in two of the drawings, are reported to have been used successfully in obtaining a satisfactory mixture. The spiral chute delivery, shown in one of the drawings, is used by the West Kentucky Coal Company, Madisonville, Ky. Coal is delivered at the top of the spiral chute and falls down this chute until it comes to rest on the top of the pile. Some segregation of the lumps will occur as the coal rolls away from the spiral chute, due to the greater tendency of the coarse coal to roll to the outside of the slope. It is reported, however, that the various sizes tend to remix when discharged through the central outlet to the tender. This arrangement also prevents breakage of the coal to some extent. The other diagram illustrates a method of preventing segregation which has been developed on the Chicago, Burlington & Quincy. This method requires no change in the usual design of coal chute other than the adding of curved plates which constitute an extension of the delivery gate to the bin. Two other diagrams were shown in the report. One illustrates an arrangement known as "baffling chutes" used on the Chesapeake & Ohio. It consists of a series of sloping plates about 24 in. wide, the slope of each reversed from that of those adjoining it, placed under the coal delivery hopper leading to the bin. It is reported that this arrangement is giving satisfactory results in overcoming segregation. The other arrangement consists of a number of vertical baffle plates extending well down into the bin, designed to prevent the lumps from rolling down the slope of the heap in the bin.—Editor.]



Spiral Chute Delivery Used by the West Kentucky Coal Company, Madisonville, Ky.

The report was signed by L. J. Joffray (I. C.), chairman; H. Morris (C. R. R. of N. J.), assistant chairman; E. E. Barrett (Roberts & Schaefer Company), D. I. Bergin (Wabash); J. D. Clark (C. & O.); H. E. Fine (M.-K.-T.); J. G. Forster (Ogle Construction Company); W. A. McGee (N. Y. C.); E. G. Sanders (A. T. & S. F.); J. Scott (S. P.); O. T. Snow (T. W. Snow Company); J. W. Tarbox (C. R. I. & P.); A. P. Wells (C. of Ga.), and J. E. Whalen (St. L.-S. F.).

Discussion

In the discussion of this report the opinion was expressed that undue criticism is directed at the coal producer in many cases for an apparent excess of slack in fuel when actually, as the report suggests, the real difficulty lies in the design of the coaling station equipment. The proper mixture of lump and slack has an important bearing on fuel economy. It was suggested that the designers of coaling station equipment might properly direct more attention to the solution of this problem, and that railroad officers responsible for the installation of coaling facilities should study the conditions existing on their individual roads in order to be able to better suggest methods for overcoming a detrimental point in design of most existing coaling stations.

Report of Committee on Storage Coal

The charges involved in connection with the storage of coal amount to a very material percentage of the total cost of such coal f. o. b. the locomotive tender, and are very large as compared with the unit fuel efficiency monetary savings. The United States Coal Commission estimated the total cost of storage to be from 50 to 75 cents per ton for large storages of fifty thousand tons or more.

Assuming that 50 cents per ton approximates the total cost of storing railroad coal during the spring and summer months, and reloading during the following fall and winter months, together with all carrying charges, this storage charge then amounts to at least ten per cent of the toal cost of the storage coal, and is accordingly reflected in our unit operating costs. If the coal is not used during the current year, the cost further increases by interest and insurance charges, and while such charges may not be reflected in the fuel costs, they must be classed as railway expenses.

Storage charges should be treated as excess handling charges, and coal should not be stored unless it is reasonably certain that the storage fuel will be used at a time when its cost per ton will equal, or be less than the per ton cost of fuel from the regular sources of supply.

The total actual output of bituminous coal in the United States during 1926, was 578,280,000 tons, or 55,300,000 tons more than produced in 1925. The 1926 figures show a variation in monthly production totaling 33,600,000 tons. This variation was affected to the extent of approximately 8,000,000 tons by export coal produced during the months of heavy production. During the period February 1 to May 1, when production was below the average, it is estimated that 9,000,000 tons of storage coal were used, and during the period October 1 to December 31 it is estimated that 11,000,000 tons were placed in storage.

The handling of storage coal during the year 1926, instead of assisting in the equalization of monthly mine productions and the equalization of railway traffic, had the contrary effect—storage coal was used during the months of low production, and coal was stored during the months of maximum production. A similar situation existed during the fall of 1922, when it is estimated that 14,000,000 tons were stored. This condition clearly shows that practice does not always follow theory.

The tremendous over-productive capacity of our mines is to a great measure due to the ability of the railways of the country to furnish the various mines with an ample supply of empty cars for loading.

The seasonal storage of coal has many times been recommended as a means of equalizing railroad traffic. The American Engineering Council present among their findings, conclusions and recommendations in connectio with storage coal, the following:

To increase transportation facilities to meet the peak demands resulting from the prevailing unsystematic practice in coal shipment would require an additional investment of some twelve billion dollars. Such an investment is not justified.

It is admitted, from a railroad standpoint, that equalization of traffic is very desirable, because it is known and admitted that during certain months of the year, traffic may be handled at a somewhat lower operating cost. It must be borne in mind, however, that in considering the handling of bituminous coal, we can hardly base the railroad savings on the total per ton cost of handling. In other words, it is not logical to consider any item of cost other than actual transportation operating costs. For example, if a railroad handles five million tons of coal annually, and such coal is uniformly distributed in amount throughout the year, the amount of additional transportation during the months of low coal production, and the amounts of less transportation during the months of maximum coal production, would not, as compared with the railroad's total traffic, be large enough to affect any costs other than the strictly transportation operating expenses. When the saving in transportation costs on a railroad equals or exceeds the storage cost, storage becomes an economy.

Statistics received from several of our largest coal carrying railroads indicate that during the month of November, 1926, when the coal production, because of abnormal demands, was the greatest in history, they were able to furnish one hundred per cent of the cars ordered for loading by the mines, but your committee was not able to develop accurate and practical figures indicating the surplus of coal carrying equipment during the months of minimum production. We may rest assured that our railroad managements will solve any equipment problem that may exist, and it is very doubtful that any such surplus as 48 per cent actually exists for any material period during the year.

The price of bituminous coal has been, is, and will continue under competitive conditions, for some years at least, to be based strictly upon supply and demand. Because of over-production, the present price very closely approaches the cost of production, and maximum efforts are being made by the coal producers to lower their mining costs. The annual average cost per ton of coal used on one of our Class I railroads, shows a decrease based on the 1921 average, of 5.64 per cent for 1922, 16.51 per cent for 1923, 25.38 per cent for 1924, 27.33 per cent for 1925, and 28.20 per cent for 1926.

It is quite difficult on a railroad to determine and hold to a fixed policy, even when coal is placed in storage. Ordinarily we do not think of storing coal until we believe that we are to be faced by some emergency which will endanger our source of supply. We then store coal to obtain a feeling of security. Storage coal remains on the ground until conditions demand that the railway's material balance be decreased, or until the storage space is required for other purposes, or until the excess storage charges have been absorbed into the operating expense, or until the fuel may be reloaded and used without increasing the unit price of coal, or until it is felt that the coal has deteriorated in size to such an extent that it should be used, or until the source of supply is endangered, and the market prices are materially higher than the cost of the storage coal. This latter reason for reloading is, of course, most important. Unfortunately, however, instead of using storage coal at a time when market prices are high, and coal is quite difficult to obtain, we sometimes over-buy beyond our consumption requirements, in order that our fuel stocks may be increased. Therefore, in practice, coal storage on railroads receiving shipments by rail, seldom works out to the financial benefit of the railroad, does not materially assist the mine operator, and does not materially assist in the equalization of railway traffic.

There is an insurance feature in connection with storage coal, and there are many consumers who, after carefully and logically analyzing conditions, store coal feeling that even though an anticipated interference with their supply does not materialize, the excess storage charges involved may be considered as an insurance premium.

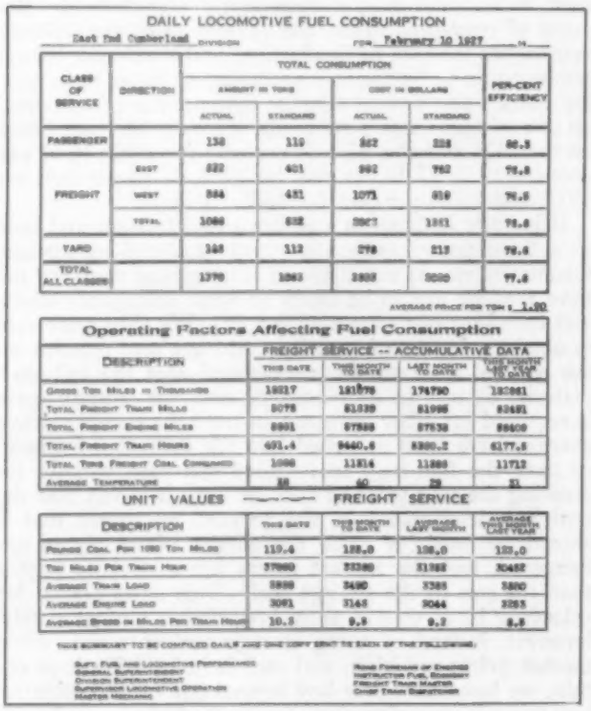
In view of the present known and determinate factors now governing the bituminous coal industry, it is the recommendation of your committee that each railroad

make a careful study of all of the features involved in connection with the storage of fuel on its line prior to unloading coal into storage, and that no fuel except reasonable amounts for insurance against emergency be unloaded into storage unless it is reasonably certain that the storage costs will be saved, offset or absorbed by savings, which will be made either in carrying rates, transportation costs, or in the price of the fuel itself.

The report was signed by Glenn Warner, (P. M.), chairman; J. F. Byrne, (Carnegie Institute of Technology); M. A. Daly, (N. P.); J. D. Davis, (Bureau Mines); C. E. Evleth, (G. N.); C. G. Hall, (W. Bledsoe & Co.); H. M. Johnson, (N. Y. C. & St. L.); C. E. Jones, (C. N.); H. M. Karstad, (O. S. L.); J. Keller, (L. V.); E. S. Kendrick, (Inland Coal Co.); W. B. Landon, (Erie); W. J. Overmire, (C. C. C. & St. L.); R. E. Rightmire, (Consolidated Coal Co.), and A. P. Wells, (C. of Ga.).

Report on Accounting Distribution and Statistics

The committee devoted the greater part of its report on the subject of forms suitable for daily reports covering fuel performance. The committee stated the reason for concentrating its efforts on this subject was that the efficient use of fuel is so intimately interwoven with efficiency in general operation, that any report for the use of operating officers should reflect the effect of general operating efficiency on fuel performance in order that, when presented to the subordinate officials below the rank of division superintendent, their efforts may be directed in the proper channels, and that necessarily, in order to be effective, this information should be presented at frequent intervals (daily would be better) and given the widest possible distribution.



DAILY LOCOMOTIVE FUEL CONSUMPTION

East Pnd Cumberland DIVISION FOR February 10 1927

CLASS OF SERVICE	DIRECTION	TOTAL CONSUMPTION				PER-CENT EFFICIENCY
		AMOUNT IN TONS		COST IN DOLLARS		
		ACTUAL	STANDARD	ACTUAL	STANDARD	
PASSENGER		130	110	662	528	80.5
FREIGHT	EAST	822	401	982	762	76.8
	WEST	864	431	1071	818	76.8
	TOTAL	1686	832	2057	1581	76.8
YARD		148	112	278	213	76.6
TOTAL ALL CLASSES		1790	1061	2808	2080	77.8

AVERAGE PRICE PER TON $ 1.80

Operating Factors Affecting Fuel Consumption

DESCRIPTION	FREIGHT SERVICE -- ACCUMULATIVE DATA			
	THIS DATE	THIS MONTH TO DATE	LAST MONTH TO DATE	THIS MONTH LAST YEAR TO DATE
GROSS TON MILES IN THOUSANDS	10017	181870	174790	183081
TOTAL FREIGHT TRAIN MILES	8078	81039	81998	82681
TOTAL FREIGHT ENGINE MILES	8801	87848	87838	88409
TOTAL FREIGHT TRAIN HOURS	491.4	9440.8	8800.2	8177.5
TOTAL TONS FREIGHT COAL CONSUMED	1098	11814	11888	11712
AVERAGE TEMPERATURE	38	40	29	31

UNIT VALUES — FREIGHT SERVICE

DESCRIPTION	THIS DATE	THIS MONTH TO DATE	AVERAGE LAST MONTH	AVERAGE THIS MONTH LAST YEAR
POUNDS COAL PER 1000 TON MILES	119.4	128.0	128.0	123.0
TON MILES PER TRAIN HOUR	37080	33280	31988	30452
AVERAGE TRAIN LOAD	3898	3490	3388	3800
AVERAGE ENGINE LOAD	3091	3145	3044	3283
AVERAGE SPEED IN MILES PER TRAIN HOUR	10.3	9.8	9.2	8.8

THIS SUMMARY TO BE COMPILED DAILY AND ONE COPY SENT TO EACH OF THE FOLLOWING:

SUPT. FUEL AND LOCOMOTIVE PERFORMANCE
GENERAL SUPERINTENDENT
DIVISION SUPERINTENDENT
SUPERVISOR LOCOMOTIVE OPERATION
MASTER MECHANIC
ROAD FOREMAN OF ENGINES
INSTRUCTOR FUEL ECONOMY
FREIGHT TRAIN MASTER
CHIEF TRAIN DISPATCHER

Daily Locomotive Fuel Consumption Report Used on the Baltimore & Ohio

The committee circularized the principal roads in the United States and Canada with a view to ascertaining to what extent daily reports of general operating factors and their effect on fuel consumption were used. The answers received clearly indicated that the use of a daily report is not general. It was found, however, that a few roads have excellent daily summary fuel performance reports.

The report used on the Frisco Lines is available in from three to four days after the date shown on the form and is sent to all operating officers from the president down through the line to the road foremen, trainmasters and fuel supervisors. This report lists eleven items covering data for the current month, previous month and the same month of the previous year. The items as they appear consecutively on the report are: train miles, gross ton-miles, gross ton-miles per train hour, gross tons per train-mile, per cent of rating hauled, pounds of fuel per 1,000 gross ton-miles, total wages, overtime wages, per cent overtime of total wages, wage cost per 1,000 gross ton-miles, and fuel cost per 1,000 gross ton-miles.

J. E. Hutchinson, vice-president of the Frisco, said: "The report gives the superintendent an opportunity to correct immediately any tendency to get into practices that do not bring about the most economical results. In fact, a glance at the total on his division will show if the day's work was in keeping with the standard for the division or whether it is higher or lower than such a standard. In either case, the superintendent will be interested at once in finding out the reason, by referring to the sub-divisions as a total, locating on which subdivision the variation has occurred, then taking that subdivision train by train and locating the trouble. . . I doubt if this could be located and remedied by any other means. . . except this close-up arrangement that we have."

The illustration shows the daily locomotive fuel consumption report used by the Baltimore & Ohio. This report is published daily and gives both daily and cumulative figures covering the basic operating factors and unit values.

D. F. Stevens, general superintendent of the northwest district of the Baltimore & Ohio, in submitting this report to the committee, had this to say about the report: "It is one of the most useful operating reports that I have, for the reason that, in today's railroading, the unit values in freight service (as shown on the bottom of this report) will, if properly maintained, take care of (virtually) all phases of the (freight train) operation. It occurs sometimes where divisions are not showing up as well as they should. I make graphic charts from the figures shown on this report to determine the trend of the particular division involved."

The Unit of Efficiency in Yard Service

Coincident with gathering information regarding daily summary, the roads circularized were asked to fill in questionnaires covering unit of efficiency in yard service. The following are some of the questions that were asked:

Q.—In computing the unit for yard or switching service what basis do you use? (A) Yard engine hour? (B) Yard engine mile? (C) Gross ton-mile?

A.—With but very few exceptions the yard engine hour or yard engine mile was used. One of the exceptions used the gross ton-mile, while the others used the basis of cars handled.

Q.—If you keep your operating statistics by divisional super-

intendent's territories, please state, how, in your opinion, the unit "Pounds of fuel per 1,000 gross ton-miles" could be used in yard service and allocated to divisions or districts when applied to yards serving two or more divisions?

A.—The opinion, almost unanimous, was that such allocation was impracticable. However, two methods were suggested, as follows: (a) (Now in use on the Nickel Plate.) To prorate the coal at joint yards to the divisions served, arbitrarily. The ton-miles, of course, are compiled by divisions. However, as no yard on this road serves more than two operating divisions, the allocation of such joint fuel is on a 50-50 basis. (b) Suggested by another road, but not, as far as can be learned, used by any road.) To prorate the tons of coal on the basis of ton-miles handled into the yard by each operating division. It is the opinion of the committee that this would be a very complicated and laborious process and its value, when obtained, is doubtful.

Q.—What is your opinion of the use of the unit "Pounds of coal per car handled?"

A.—This is used by a number of roads, but the consensus of opinion was that this unit was good only as a measure of general efficiency.

The answers to the inquiry regarding the unit of efficiency in yard service, apparently indicate that most roads are satisfied that while the engine hour or mile is far from perfect, it is at least as good as any other known basis.

The report was signed by B. A. McDowell (B. & O.), chairman; E. J. Brennan, (C. G. W.); J. N. Clark, (S. P.); E. E. Evans, (Soo Line); R. W. Hunt, (A. T. & S. F.); J. L. Marley, (I. C.); C. S. Perry, (R. F. & P.); H. E. Martin, (St. L.-S.F.); Heister Piolett, (L. V.); C. S. Pond, (S. P. Lines); G. G. Ritchie, (C. & O.); J. J. Stahl, (Southern); W. J. Tapp, (D. & R. G. W.); J. J. Tobin, (B. & M.); S. C. Welby, (C. N.) and A. E. White, (N. Y., N. H. & H.).

How to Improve Employees' Health

REGULAR periodical physical examination of employees—railroad or any other—would result in definite lengthening of the useful years of the men's lives and would, after a few years, diminish the cost of pensioning employees who become physically unfit before the maximum age. This and other interesting conclusions are set forth in a paper on "Automatic Health Control" which was read recently at a meeting of Illinois Central surgeons by Dr. Don W. Deal, of Springfield, Ill., chief surgeon of the Chicago & Illinois Midland.

Dr. Deal began by observing that while the great majority of physicians enthusiastically endorse periodical examinations, only a small percentage of them confirm their belief by submitting actually to examinations themselves. He thinks that 40 per cent of practicing physicians would be found to have organic defects or abnormalities that ought to receive attention. Proper examinations would increase the span of life at least ten years for many such men. At a convention in Springfield recently, 80 dentists, of Illinois, were examined by 18 physicians, and fully 50 per cent of the subjects had physical illness which up to that time had been entirely unsuspected. Systematic periodic examinations have been formally endorsed by the American Medical Association; but individual doctors are a trifle dilatory or reluctant in putting the idea into practical use. It has been observed that the public has more advanced ideas than the doctors, and may possibly drive the medical profession. It is necessary for the profession to act in order to cope with various medical fads.

The calculated future earning capacity of a man 25 years old has a present value of $32,000 and this prospective value can be very definitely increased. The Metropolitan Life Insurance Company, making a study recently of the cases of 16,662 men, found that railway employees who are promoted from work in which they are physically active, to supervisory positions, have a tendency to put on weight; and that of those over-heavy men, 75 per cent are likely early to experience impaired health.

Recounting the various symptoms which are found in the examination of men who think they have pretty fair health—two dozen or more definite defective conditions — and after describing the same situation in another list of two dozen names of diseases, Dr. Deal went on to exhort railroad executive officers to take definite action. He observed, however, that in many cases, it is found that "big business" men have more advanced views than do the doctors. Employers of large numbers of men have found that the average loss of time due to illness may be reduced, by regular examinations, from seven days to four days.

A survey of American industries shows that complete medical supervision, including examinations, need not cost over 1½ cents per day per employee; and such expenditure would be profitable because of the prevention of accidents and increase in efficiency. Railroads are beginning to realize the importance of periodic examinations of men in the operating department as a preventive of blunders or failures which result in collisions of trains.

"On account of the attitude of many employees, some employers have felt that the subject must be approached cautiously and that examinations should be made optional with the men, an effort being made to educate them to its advantage. In this, the railway surgeon, in his ordinary contact with employees, can exercise considerable influence; but even so, the process will be deadly slow and much valuable time will be lost. If the employees could be made to see the significance of the fact that the middle age period is the one in which the serious defects will usually make their first appearance, and if they will stop to consider that, in even the golden age of youth, from 18 to 25 years, the selective draft found 33 per cent unfit for military service and most of the defects remediable, they will come to see that periodic examination really means much to them."

Of course, there is great benefit for the men themselves; the public and the employer are benefited but their gain is small in comparison with that of the individual. The suspicions of employees must be overcome by the utmost candor and frankness. They must be made to see that a temporary lay-off for a brief season will actually increase the total number of working years. To the employer, Dr. Deal urges that for persons between the ages of 40 and 60, there is still room for great improvement notwithstanding the lengthening of the expectancy of life which has been accomplished in the last 20 years as expressed in percentages of the whole population.

Doctor Hartman, of the Michigan Central, reporting recently on an extensive study of the pensioners of that road says that 53 per cent of the individuals who were pensioned because of physical disability, had been pensioned because of preventable causes; and with proper attention would have had their economic life extended about 6½ years. There is no great difficulty in securing the co-operation of the individual after the examination has been made and the defects pointed out. In one large group of men only three per cent refused to have treatment.

Oregon Construction Authorized by I. C. C.

Conditions imposed a year ago abandoned because of practical exigencies of the situation

WASHINGTON, D. C.

THE Interstate Commerce Commission has finally abandoned the conditions which it imposed a year ago in connection with its authorization of the construction of new lines in eastern and southern Oregon by the Oregon Trunk and the Oregon, California & Eastern, which required that arrangements be made between the roads for joint operation either of the Southern Pacific Natron Cut-off or portions of the O. C. & E., in order to avoid duplicate construction.

After a year of delay caused by the failure of the roads concerned to reach an agreement as to the terms upon which the commission's plan might be made effective, the commission on May 14, made public a second supplemental report in the Oregon construction cases holding that, in view of the need for the new lines proposed, the practical exigencies of the situation require that the construction shall be permitted, "notwithstanding the indeterminate amount of parallelism or duplication of lines required."

A certificate was issued authorizing the Oregon Trunk to build its line from Bend to Klamath Falls, Ore., by way of Paunina, conditioned only on unconditional acceptance by that carrier and its agreement to begin construction within 60 days and complete it within two years. Conditions imposed in the original order, as recently modified, authorizing construction by the Oregon, California & Eastern of three branches in Klamath and Lake counties, Ore., and the acquisition of control of the O. C. & E., by the Southern Pacific by purchase of capital stock, were vacated and removed so far as relating to the joint operation of lines by either of those carriers and the Oregon Trunk. The application of the Great Northern for leave to intervene and to be substituted for the Oregon Trunk in the order for the construction of the line south from Bend, which was recently filed with the commission after the Oregon Trunk had declined to build on the terms stated, was denied without prejudice to its right to submit an independent application for a certificate for the construction of a line or for the acquisition or operation of the line to be constructed by the Oregon Trunk.

The report, by Commissioner Aitchison, points out, however, "that it will be possible for all concerned, by the exercise of the spirit of co-operation which modern railroading requires, yet to come to agreement and avoid the needless expenditure of capital for which each of them can find beneficial use." Commissioner Eastman dissented, objecting to the removal of the conditions on the ground that they are important to avoid wasteful expense in giving competitors access to territory preempted by the Southern Pacific and also in connection with possible east-and-west construction in the future by the Union Pacific. Commissioner Meyer, being absent, did not participate.

The original report of the commission in these cases, made public on May 11, 1926, was abstracted in the *Railway Age* of May 15, 1926, page 1313. An abstract of the second supplemental report, dated May 11, and of Commissioner Eastman's opinion, follows:

Second Supplemental Report

As a result of the previous proceedings, we unconditionally authorized the construction of a new line between Klamath Falls, Ore., and Alturas, Cal. (the "Modoc Northern") by the Central Pacific Railway Company; and we unconditionally approved the application of the Southern Pacific Company for authority to acquire control of the Nevada-California-Oregon Railway, upon the announced purpose of the Southern Pacific Company to standardize the gage of that line of railway and otherwise to improve it. We also gave preliminary and conditional approval of, but reserved final action upon, the application of the Oregon Trunk Railway to construct a new line of railroad in Deschutes and Klamath counties, Ore., from Bend, Ore., to Klamath Falls, and took like action upon the application of the Oregon, California & Eastern to construct extensions of its line of railroad in Lake and Klamath counties, Ore., and of the Southern Pacific

New Lines Authorized in Oregon

Central Pacific Line from Klamath Falls to Alturas, Authorized Unconditionally a Year Ago

Company to acquire control of the Oregon, California & Eastern Railway Company by the purchase of its capital stock.

On May 3, 1927, to prevent the complete lapse of the certificates and the proceedings, which would have compelled all parties to repeat the formal steps, we so modified the certificate and order as to require that each railway shall commence construction on or before June 17, 1927, but otherwise let the outstanding certificate and order stand.

In the original report we emphasized the strong necessity for the co-operation of all the carriers involved in the formulation of plans which would give the Oregon Trunk Railway, and through it the Spokane, Portland & Seattle Railway Company, the Great Northern Railway Company and the Northern Pacific Railway Company access to the Klamath Basin with a minimum of new construction. We indicated that the use of the Natron Cut-off of the Central Pacific Railway, between Paunina and Klamath Falls, was desirable, or, as an alternative, the joint use of portions of the constructed and proposed lines of the Oregon, California & Eastern. The conditions we reserved were intended to bring about this joint use, with the view to minimizing the total amount of capital and carrying charges upon which rates are based, and to free capital for uses more beneficial than the unnecessary duplication of railway lines.

The carriers failed to reach an agreement as to the terms upon

which our plan might be made effective. They made their representations as to their respective positions. Upon consideration of these we issued a supplemental report on February 15, 1927 We found that the proposal of the Central Pacific, made through the Southern Pacific, to grant the Oregon Trunk trackage rights over the Natron Cut-off between Paunina and Klamath Falls, with certain modifications, was substantially in conformity with the conclusions announced in the original report; and we allowed the Southern Pacific 25 days in which to prepare and present to the Oregon Trunk and to file with us a complete draft of its proposed trackage agreement. The Oregon Trunk was allowed 20 days after such filing in which to notify us whether the terms proposed were acceptable, or to except to them as not consistent with our conclusions or with proper usage in trackage agreements.

Under date of April 22, 1927, we have been advised by the Oregon Trunk that the terms offered to it are unacceptable. It will be noted that it does not flatly decline to go on with its project, but is not willing to extend its line from Bend to Paunina on the terms stated by us, or to take trackage over the Natron Cut-off from Paunina to Klamath Falls on the terms set forth in the proposed contract submitted by the Southern Pacific.

At the same time, the Great Northern Railway Company submitted to us a petition for leave to intervene in the proceeding which involved the application of the Oregon Trunk Railway, for amendment of the order and certificate heretofore made, and for certificates of convenience and necessity covering the operation by it over the lines of the Spokane, Portland & Seattle Railway Company from Spokane, Wash., to Portland, Ore., and over various railroads from the north bank of the Columbia River to Klamath Falls, and also certain branches from the Natron Cut-off in Klamath Falls. It prayed that it be substituted for the Oregon Trunk Railway as a party. The plan it proposed was, as will be seen, widely variant from that involved in the Oregon Trunk's application, and, of course, no one has had any opportunity to be heard on such features. The application was likewise coupled with conditions and contingencies, not here necessary to be stated.

The Oregon Trunk has not consented to the substitution, and, as has been shown, it has not completely withdrawn itself from the field. It has merely announced that our previous terms, and the conditions sought to be imposed by the Southern Pacific for joint use of the Natron Cut-off, are such that it is unwilling to proceed thereunder. It has sought no rehearing or specific modification of our previous findings; it has not attempted to bring to our attention in a manner so all concerned may be heard and we may determine the additional construction which the Great Northern now says would be necessary if the Natron Cut-off were to be used by a line of railway coming from Bend.

It appears from the original report that the Oregon Trunk is a subsidiary of the Great Northern and Northern Pacific, through the intermediary ownership by the Spokane, Portland & Seattle, which in turn is owned half-and-half by the two Northern lines. Seemingly the Northern Pacific is not now desirous of proceeding with its part of the programme of the Oregon Trunk, although upon the hearing thereof the vice-president of that company in charge of traffic appeared as a witness in support of the application and strongly justified the proposed construction, as far as participation by his company was concerned, as both necessary and probably already unduly belated. No explanation appears of record for this change of position. The Great Northern, seemingly desirous of participating in the traffic of the Klamath Basin, has tendered its programme. Obviously the benefits of a line operated and controlled by only the Great Northern would not be as great as if the Northern Pacific were likewise a participant; and the question presented by the Great Northern is not the one which was presented upon the application of the Oregon Trunk, and as to which all interests were heard *in extenso*. This situation warrants us on our own motion, in re-examining the whole record with a view to determining what, in the light of the facts as subsequently developed and brought into the record, the public convenience and necessity may require.

Our previous orders gave the Northern lines what they sought. The original application of the Oregon Trunk was made in the name of that carrier, but as stated by its counsel in their brief, "the moving parties here are the Great Northern Railway Company and the Northern Pacific Railway Company, which seek to construct a feeder line because of the valuable long haul traffic to be secured." The Oregon Trunk expressed to us its willingness to "enter into any reasonable arrangement for economical joint construction or joint use, conditional only upon its securing an adequate railroad built to the standards stated in its application, into the Klamath Basin to Klamath Falls." It showed to us in pursuance of such expressed policy that it had endeavored to secure from the Southern Pacific Company the right to operate over that portion of the Natron Cut-off which lies between Paunina and Klamath Falls, "believing such a plan to be mutually advantageous," and that it presented its alternative "D" line for our consideration only when the Southern Pacific had refused to consider any plan for joint construction or joint use. The result of our previous findings and orders has been that the Southern Pacific has now offered the Oregon Trunk the common user originally sought. Such use would give the Northern lines access to the Klamath Basin and to Klamath Falls more economically and more quickly than the arrangement suggested in the application itself. Now the Oregon Trunk signifies its unwillingness to accept the common user arrangement which it originally sought. Without now expressing opinion as to details of the terms proposed by the Southern Pacific, what it asks will involve a present lesser annual carrying charge than will follow if construction proceeds as originally proposed in the Oregon Trunk application.

Certain of the details of the proposed contract would in any event require further consideration and amendment. The term proposed is 999 years, with no provision for cancellation or readjustment in terms. This feature of the contract proposed by the Southern Pacific we would not be able to approve upon this record. While this and other matters to which the Great Northern takes exception might be reconciled between the parties and put in consonance with the public interest, there has been abundant but fruitless opportunity for adjustment, and long negotiations and the good offices of members of the Commission have failed to bring about such a result.

As the situation stands, Oregon is shown to be in need of the railroad lines proposed by the Oregon Trunk and by the Oregon, California & Eastern. That need was shown upon a record made many months ago, and no one has suggested that it has diminished. It is obvious that the construction of these lines can be secured under common user, if at all, only as the result of further prolonged negotiations; and that meantime the public need is not being met. It is regrettable that the fullest possible utilization of the Natron Cut-off is not feasible, both because of the lesser carrying charge such use would impose upon traffic, and because time would be saved in getting the Northern lines into the Klamath Basin.

The Great Northern's petition to intervene and be substituted will be denied, for reasons already indicated. There is no reason now apparent that the construction sought by the Oregon Trunk should not proceed by the forces of that company, upon funds to be advanced by the Great Northern, if so mutually agreed, and that thereafter the Great Northern might not make suitable application under the law for authority to take over in some appropriate manner the operation of the extension southward from Bend, which can then be heard, and, if found to be in the public interest, can be granted.

The whole theory upon which certificates of convenience and necessity should be sought is that the applicant stands ready, willing, and able to comply with such reasonable conditions as may be imposed by lawful authority, and will construct the line sought within a reasonable time. Our conclusion as to the line of the Oregon Trunk will, therefore, be predicated upon conditions which will make it certain that the certificate issued will be so utilized.

The failure of previous negotiations, and our action in now lifting the conditions in these certificates, in no wise lessens the duty of these carriers to bring about the prompt construction of needed railway lines in central Oregon while holding to a minimum the expenditure required and upon which future traffic must carry the charges. The negotiations between the carriers may well continue while the construction work proceeds. There is still ample opportunity for the carriers to reach an agreement which will accomplish the declared purpose of all of them, and, what is obviously in the public interest, the avoidance of wasteful expenditure.

Commissioner Eastman Dissents

EASTMAN, *Commissioner*, dissenting:

The majority undertake to secure competition in the Klamath basin section by granting to the Oregon Trunk an unconditional right to build its so-called "D" line, although we have heretofore refused a certificate for this line on the ground that it would involve wasteful construction from Paunina south in the event that the Southern Pacific is willing to grant trackage rights over its Natron Cut-off between Paunina and Klamath Falls. That carrier has gone a long distance toward the grant of such rights upon reasonable terms, and in so far as controversy still exists as to terms it appears quite capable of adjustment with our aid. The obstacle to progress, as I understand the situation, is now the fact that the Northern Pacific, an equal partner with the Great Northern in the Oregon Trunk has abandoned the enterprise of extending that line south into the Klamath basin. Unless the Northern Pacific reconsiders, even the grant of the right to build the "D" line is, therefore, likely to prove futile.

On the other hand the Great Northern is keenly desirous of extending its service to the basin as a substitute for the Oregon

Trunk project. Under the circumstances it seems to me that steps should be taken to consider the Great Northern's proposal at as early a date as possible, and that in the meantime no unconditional right should be given to the Oregon, California & Eastern to construct its proposed extensions, and that no unconditional right should be given the Southern Pacific to acquire control of the Oregon, California & Eastern. The latter road and its proposed extensions, together with the Natron Cut-off, occupy or will occupy the strategic locations for lines of railroads in the Klamath basin territory. To avoid wasteful and perhaps prohibitive expense in giving competitors access to this rich territory, the grants to the Southern Pacific and the Oregon, California & Eastern should be on condition that they will in the future grant trackage rights over the lines above mentioned which have been or are to be constructed, at our direction and upon such reasonable terms as we may approve. Such conditions could, if desired, be safeguarded by appropriate language so that the Southern Pacific and the Oregon, California & Eastern would be protected, not only by our supervision, but by specific provisions included in the conditions, against trackage rights upon terms which would involve unfair imposition.

Railway Surgeons at Richmond

THE Medical and Surgical section of the American Railway Association held its seventh annual meeting at the Jefferson hotel, Richmond, Va., on Monday and Tuesday, May 16 and 17. The first business session was taken up largely by an address, accompanied by lantern demonstrations, concerning carcinoma, by Dr. J. M. Wainwright (D. L. & W.); and one on arthro-plastry by Dr. W. R. MacAusland of Boston. The latter was illustrated by a motion picture.

Other papers read on Monday were by Dr. Frederick Allen, Dr. W. L. Hartman (Mich. Cent.), Dr. J. R. Garner (Western of Alabama) and by Dr. W. B. Coley (N. Y. C.).

Dr. Garner's paper was a report of the committee on occupational diseases and represented the work of four meetings which had been held by this committee during the past year. The principal subjects treated were the use of charcoal heaters in bunk cars; tetanus in connection with railroad injuries; diabetes in railroad employees; cardio-vascular-renal disease; syphilis; malaria; eye injuries, color blindness and goggles; skin conditions resulting from work on creosoted timber; ulcers resulting from handling engine packing compounds; hazards from pyroxylin lacquers; trichophytosis; fees for emergency calls on sick passengers or employees; sanitation in relation to toilets and showers and examination of employees in train service.

On Tuesday, Dr. C. W. Hopkins presented the report of his committee on standardization of treatment for fractures. The committee on drinking water, reviewing a report made at a previous meeting, presented a succinct discussion on the design of coach yards, the delivery of food to dining cars and the handling of ice; protection for station house wells and the transportation in tanks of water to be used for culinary purposes. It was stated that many railroads are reporting on water supply to the United States Public Health Service where no report is required because the water is not used in interstate traffic.

A special committee, Dr. T. R. Crowder, chairman, reported a proposed code of rules to be followed in disposal of bodies of passengers who die on trains in transit.

The election of officers resulted in the choice of the following, all being re-elections:

Chairman, Dr. W. H. Bohart (C. & E. I.); First Vice-Chairman, Dr. L. A. Ensminger (C. C. C. & St. L.); Second Vice-Chairman, Dr. S. C. Plummer (C. R. I. & P.). Secretary J. C. Caviston holds over.

The Section held a dinner at the Jefferson on Monday evening at which time the members were addressed by the governor of Virginia, Harry F. Byrd, and by T. C. Powell, president of the Chicago & Eastern Illinois.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended May 7 amounted to 1,024,416 cars, an increase of 28,200 cars as compared with the corresponding week of last year and of 41,382 cars as compared with 1925. This was the fifth week this year in which the loading has exceeded a million cars. Increases as compared with last year were shown in all districts except the Eastern and Southwestern, and in the loading of grain and grain products, livestock, merchandise and miscellaneous freight. Both of the latter two items showed increases of over 18,000 cars. Loading of coal was 5,786 cars less than that for the corresponding week of last year. The summary, as compiled by the Car Service Division of the American Railway Association, for the week ended May 7 and also that for the week ended April 30, which was omitted from last week's issue, follows:

Revenue Freight Car Loading

Week Ended Saturday, April 30, 1927

Districts	1927	1926	1925
Eastern	244,991	245,271	236,806
Allegheny	206,221	206,153	201,208
Pocahontas	63,208	51,322	45,835
Southern	158,888	153,207	148,416
Northwestern	149,922	124,691	150,889
Central Western	134,190	138,586	128,288
Southwestern	69,020	76,178	72,631
Total West. Districts	353,132	339,455	351,808
Total all roads	1,026,440	995,408	984,073
Commodities			
Grain and grain products	43,582	37,973	36,068
Live stock	29,363	31,843	30,460
Coal	162,583	165,635	150,754
Coke	11,168	12,113	10,117
Forest products	70,325	77,559	78,438
Ore	48,827	20,811	59,143
Mdse. l. c. l.	265,178	262,904	260,463
Miscellaneous	395,414	386,570	358,630

Week Ended Saturday, May 7, 1927

Districts	1927	1926	1925
Eastern	239,112	242,838	235,053
Allegheny	209,099	201,840	202,140
Pocahontas	61,877	53,356	47,975
Southern	154,272	149,010	144,110
Northwestern	155,148	142,961	151,683
Central Western	134,255	133,531	129,305
Southwestern	70,653	72,680	72,768
Total West. Districts	360,056	349,172	253,756
Total all roads	1,024,416	996,216	983,034
Commodities			
Grain and grain products	40,510	36,329	35,995
Live stock	29,505	28,960	27,669
Coal	156,668	162,454	155,667
Coke	10,840	11,923	9,382
Forest products	68,705	74,304	76,403
Ore	56,476	38,344	64,651
Merchandise, l. c. l.	264,755	265,816	261,027
Miscellaneous	396,957	387,086	352,240
April 30	1,026,440	995,408	984,073
April 23	955,215	973,158	961,186
April 16	956,875	964,794	923,844
April 9	959,474	929,343	918,400
Cumulative total, 19 weeks	18,280,240	17,770,207	17,476,346

The freight car surplus for the period ended April 30 averaged 259,736 cars, including 90,075 coal cars and 127,432 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended May 7 totalled 61,662 cars, a decrease from the previous week of 570 cars and an increase over the same week last year of 4,291 cars.

	Total for Canada			Cumulative totals to date	
Live Stock	May 7 1927	April 30 1927	May 8 1926	1927	1926
Grain and Grain Products	7,751	8,318	6,506	142,730	118,970
Live stock	1,792	1,848	1,992	36,543	37,015
Coal	6,432	5,857	4,371	112,810	78,954
Coke	414	205	301	6,313	8,082
Lumber	3,858	3,827	3,510	59,307	60,202
Pulpwood	1,548	1,714	1,919	83,777	62,147
Pulp and paper	2,207	2,286	2,489	40,129	46,574
Other forest products	2,741	2,843	3,124	58,864	63,159
Ore	1,743	1,536	1,468	25,678	25,664
Merchandise, L. C. L.	17,472	18,561	17,080	298,381	278,638
Miscellaneous	15,704	15,237	14,611	222,973	212,953
Total cars loaded	61,662	62,232	57,371	1,087,505	992,358
Total cars received from connections	38,573	38,049	37,618	706,326	674,144

Pumps Mounted on Cars Keep Down Water Level at Illinois Central Shops Behind Sea Wall at Vicksburg, Miss.

Railways on West Bank of Mississippi Suffer Heavy Flood Losses

Louisiana and Arkansas lines struggling to maintain service against almost overwhelming odds

By Charles Layng,
Transportation Editor, *Railway Age*

BY far the majority of the serious levee breaks dur- the present flood have occurred on the west bank of the Mississippi river. In addition, levee breaks and overflows from the Arkansas, Red, Ouachita, St. Francis, Atchafalaya and many smaller rivers have inflicted severe damage. At present, large sections of eastern and southeastern Arkansas are still under water, while northeastern Louisiana is completely inundated.

Bayou des Glaises Breaks Most Serious

Breaks have been occurring daily in the Bayou des Glaises series of levees for the past week. These will have the effect of flooding southeastern Louisiana, west of the Mississippi, almost entirely. This is by far the most serious situation faced by the railways at this time. The system of levees in the Bayou des Glaises district was built to hold the flood waters of the Red river only, and, when they were inspected by the writer on May 12, they appeared adequate for this purpose. However, with the whole of northeastern Louisiana flooded with the waters of half a dozen rivers, including the Mississippi and the Arkansas, the water rose to an entirely unforeseen stage and this levee system proved inadequate. Breaks have occurred in the past few days at Cottonport, La., Moreauville, Bordleonville, Kleinwood and Voorhies. These breaks will soon result in the inundation of the famous "sugar bowl" district of Louisiana and will cover the main line of the Texas & Pacific, the Missouri Pacific and the Gulf Coast Lines into New Orleans. besides numerous branch lines. A vast body of water will be poured into the Atchafalaya basin, where the Atchafalaya river is already near the top of its levees. Within a few weeks, this water will have poured into Grand Lake, in south-central Louisiana, and it is quite likely that operations on the main line of the Southern Pacific, which crosses the outlet of Grand Lake just west of Morgan City, La., will be seriously hampered, if not entirely stopped. When this occurs, New Orleans will be entirely cut off from railway service to the West.

T. & P. Cut Off from New Orleans

The Atchafalya river levee at Melville, La., broke on May 16. This break severs the last link of the Texas & Pacific main line into New Orleans. The Missouri Pacific also uses this line as its New Orleans entry. When the writer was at Melville on May 11, the Texas & Pacific bridge at that point was being overflowed. This bridge is 1,500 ft. long and the truss spans were being subjected to enormous pressure by the swift current, with water at the level of the rails. Despite all efforts to save it one span of this bridge was washed away on May 18. At that time a force of 100 men was employed in pushing the drift away from the structure and otherwise attempting to save it. The Texas & Pacific track for a distance of eight miles from Melville has been flashboarded and sandbagged on the down-

stream side. All of this track is at present under water. The last train left Melville with refugees on May 16.

Recession of Water in North Enables Damage to Be Estimated

The first passenger train to be run since the tracks were flooded was operated over the main line of the Missouri Pacific between New Orleans and St. Louis on May 13. The writer rode this train from Alexandria,

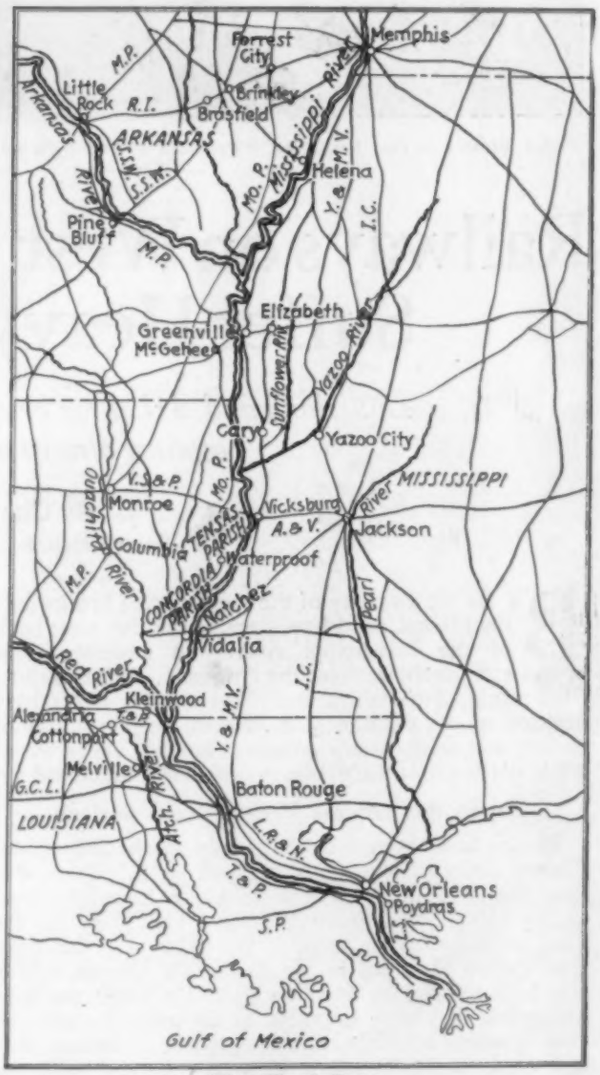
Rock Island Track Two Days After Emerging from the Flood

La., to Little Rock, Ark., via McGehee, and found much of the track is still under water, which was deep enough, in many places, to come up nearly to the floors of the cars. The Missouri Pacific crosses a bridge over the Red river, immediately after leaving Alexandria, and, while the approaches are but a few inches out of water, the bridge and its approaches appear to be holding very well. The track is entirely under water from Columbia, La., to Monroe, 23 miles, and there is still more water immediately north of Monroe. In places where the water has gone down, the track and embankment do not appear to have been badly damaged as the flood in this section was backwater, without any strong currents, and this type of inundation has not affected tracks or embankments seriously in any part of the flooded zone. For six miles south of McGehee, however, where the water flowed over the tracks with a swift current, a good deal of damage was done. The embankment was badly washed out and, while no track was lost, it will be necessary to rebuild the embankment almost in its entirety. Although the track had only been out of water for two days, extra gangs were busily engaged in repairing it and had succeeded in getting it in shape so that a heavy passenger train could operate over it under slow orders.

In this district, due to the low level of the surrounding country, the railway embankment was the last to go under water. For this reason, thousands of animals sought refuge there, only to be drowned as the water rose higher. For several miles the track is littered with the carcasses of thousands of drowned animals, both wild and domesticated, including several hundred head of cattle and horses. In this connection, claim adjusters on roads farther north report that, in almost every instance, claims made for loss of livestock in the flooded zone are legitimate, and no attempt is being made to claim damages for drowned stock that may have been floated on to the right of way.

Pre-Flood Prevention Work Effective

Much flood protection work was done along this line of the Missouri Pacific. North of Alexandria, where the current was strong, the track was flashboarded on both sides to prevent washing. The track under water is constantly patrolled by section men, who keep a particularly careful watch on trestles and bridges. In some places, fences were built in the water on the upstream side, about ten feet away from the trestles, to break the current, and to keep driftwood from piling against the bents and weakening the structures. Approaches to bridges and trestles are also heavily buttressed with sand bags to prevent washouts. North of the passenger station at Monroe the track was heavily sandbagged and



The Flood Zone

flashboarded for a distance of more than a mile, where the current was strong. In many places along the line, the telegraph poles and wires are completely under water, and extensions have been nailed to the poles, on which the wires are strung temporarily to keep them out of the water.

For several miles, along the stretch of track just south of McGehee, where the strongest current was encountered, stakes were driven on both sides of the track and the ties were wired to these stakes. Despite the fact that much embankment was washed out here, the track held, supported by the stakes and wires.

The town of McGehee proper was under several feet of water for a short time, but this has receded, except in the lower sections. The Missouri Pacific station and other railway buildings in the vicinity were inundated and considerable damage was done. The shops are situated on higher ground, however, and the water there was only a few inches over the floor, with the result that only minor damage was inflicted.

The line from McGehee to Arkansas City is still under water, but the water is draining from it slowly. Between McGehee and Pine Bluff, where the tracks were covered in some places, most of the flood damage, which was light in this section, has been repaired.

Eastern Arkansas Emerging

Although it is nearly a month since three spans of the Missouri Pacific bridge at Little Rock fell into the Arkansas river there, with 14 loaded coal cars, the spans and cars which were swept away had not yet made their appearance above the flood, when the writer was in Little Rock on May 12. The Missouri Pacific is making rapid progress on its work of double tracking its line through Little Rock to take care of the congested situation caused by having to handle all its trains over one bridge there.

More Than Thirty Houses Were Washed Onto Rock Island Embankment

Most of the lines of the Missouri Pacific between Little Rock and Helena and between Helena and Memphis are entirely out of water, after being submerged for some weeks. The water covering the tracks here was largely backwater and did comparatively little damage. Similar protective measures were used in this section to those in effect on the line in the vicinity of McGehee, and, while there were some washouts, the track held well.

Thirty Houses on a Railroad Embankment

During a trip over the line of the Chicago, Rock Island & Pacific from Memphis to Little Rock on May 13, the writer counted more than 30 houses of all sizes, which had been washed against the railway embankment during the flood. While none of the track on this division is under water, much of the surrounding country is still inundated, particularly between Memphis and Forrest City, Ark., and between Brinkley, Ark., and Brasfield. The west approach to the Mississippi river bridge at Memphis is on a high fill. By reason of subsidence caused by the flood, this fill is sliding badly, particularly on the north or upstream side. It has been necessary to discontinue the use of the north track on this approach, because of this sliding. Between Brasfield and Brinkley the track was overflowed to a depth of ten feet in some places, with a very swift current. As a result, despite all precaution, several miles of rails and ties were washed

Rock Island Trestle Heavily Buttressed Near Forrest City, Ark.

Track Protection on Y. & M. V. Near Vicksburg

off the embankment and down the side. Except for one stretch of a half mile, however, it was possible to lift all of this track back onto the embankment again, by means of boats equipped with windlasses.

Ordinarily, the country traversed is low and swampy in most places. The track embankment is high and there are numerous trestles. By sandbagging these trestles and keeping the approaches from crumbling by building wooden wing walls, all trestles were saved.

As it happened, a tie renewal program was in progress when the flood arrived and thousands of ties were lying

Near Columbia, La., on the Missouri Pacific

on the right of way. Most of these were saved from being washed away by anchoring them to the track with wires. The superintendent of this division was marooned in a work train for nearly two days, and the water rose so high that he and the crew had to seek safety on top of the caboose. Hundreds of automobiles were stored on station platforms on this division by neighboring farmers, who also loaded many pigs and chickens on flat cars, to keep them out of water.

Normal service has been restored from Little Rock, Memphis, Pine Bluff and St. Louis. All lines have repaired the damage done by the floods and are operating on a pre-flood basis. As a matter of fact, in this section, so far as the railways are concerned, there is very little evidence of a flood having occurred.

Flood Protection Measures

In general, throughout the flooded district, crushed rock, loose and in bags has been found very efficient in preventing washouts in the embankments and in keeping the tracks in place. On the St. Louis-San Francisco for example, where crushed rock is plentiful and readily available, large quantities of it were used and not a rail length of track was lost. In Louisiana, however, where crushed rock was not readily available, flashboarding with the ties wired to the posts supporting the flashboards and the flashboards themselves buttressed with sand bags, was found to hold the track in place, even where there was a swift current. Wiring the track to stakes also proved efficient in holding the ties and track in place, but, of course, afforded no protection to the embankment.

That comparatively few bridges and trestles were washed out is explained by the fact that the flood consists very largely of backwater, and, where the current was swift, the trestles were sufficiently protected by wingwalls and sandbagging at the approaches to hold them. In most places, where it was physically possible to do so, section men were stationed at bridges and trestles, in boats at most places, to fend off the driftwood and keep it from lodging against the bents, which would, of course, have increased the pressure and rendered the structures vulnerable. On the Rock Island in Arkansas, it was necessary for section men to chop several houses to pieces, when they floated against trestles and lodged there. Fortunately, all of the houses that were washed against trestles were of flimsy construction and easily wrecked.

Flood Summary

In order that the situation may be understood, as far as the railways in the flooded districts are concerned, the following summary, approximately in chronological order, is given:

The first and most northern levee break occurred on the Mississippi, at Gorham, Ill. This had the effect, with the overflows from the Ohio and Cache rivers, of cutting the line of the Missouri Pacific and the St. Louis Southwestern between St. Louis and Thebes, Ill., and also severing the main line of the Mobile & Ohio from St. Louis to Mobile. In addition, the Mounds yards of the Illinois Central were inundated, and the circular track around Cairo was partly under water. South of the Ohio river, the Illinois Central track was under water as far as Wyckliffe, Ky. This was one of the first manifestations of the flood, and, as the crest passed, rehabili-

The Y. & M. V. Enginehouse at Baton Rouge Protected by Bags of Cinders

tation measures were taken, so that railway service is now entirely normal in these districts.

At the same time, storms and minor floods were hampering operations on the Missouri-Kansas-Texas, the Atchison, Topeka & Santa Fe and, the Kansas City Southern, in eastern Kansas and Oklahoma, but the damage done was relatively light and normal service was soon restored.

Another levee break occurred at Dorena, Mo., on the west bank, which flooded several miles of branch lines in that section and also severed the main lines of the

Missouri Pacific, the St. Louis-San Francisco and the St. Louis Southwestern. Added to this was a very severe flood in Southeastern Missouri and northeastern Arkansas, brought about by overflows and levee breaks on the St. Francis, White, Cache and smaller streams. These cut the main lines of all railroads between Little Rock and Memphis, including the Chicago, Rock Island & Pacific, the Missouri Pacifice and the St. Louis Southwestern. After some weeks of hard fighting, normal service has been restored in this section as well, although much water still covers the country in this vicinity.

The second break on the east bank of the Mississippi occurred at Stops Landing, Miss., just north of Greenville. This break resulted very seriously. Within a week, more than 275 miles of the Greenville division of the Yazoo & Mississippi valley had been flooded and much of this track is still under water. Several miles of the Columbus & Greenville were also inundated. Swift currents existed at several places in this vicinity and much track was washed out. It is estimated now that service cannot be resumed through much of this district

Dikes Were Built to Hem in Sand Boils at Y. & M. V. Shops, Vicksburg

before June 15, and it will require some time after that date before the railways affected will be operating normally. The first passenger train from Memphis to Belzoni, Miss., since the latter town was flooded three weeks ago, was operated May 13, and regular service will be maintained hereafter. Service has been maintained from Memphis to Rosedale, Miss., throughout the high water, but it has been impossible to operate south of that point.

The break at Stops Landing sent the waters of the Mississippi into the Yazoo and Sunflower rivers and many of the small levees guarding those streams promptly broke, until eventually, practically all of western Mississippi north of Vicksburg and south of Greenville was under water. The utilization of pumps, by which the I. C. shops at Vicksburg were saved from inundation and much damage, was described in last week's issue.

Simultaneously with the break at Stops Landing, a number of serious breaks occurring in the levee system of the Arkansas river, flooding southeastern Arkansas and northeastern Louisiana, including the cities of Helena, Arkansas City and McGehee in Arkansas, the latter being an important division point on the Missouri Pacific. Arkansas City is still under water and the line of the Missouri Pacific between McGehee and Arkansas City has been out of service and under several feet of water for weeks, with no present indication of how soon the water will recede. It was during this period

Levee at Baton Rouge Raised Five Feet by Illinois Central

that the bridge across the Arkansas river at Little Rock was washed away. Service in and out of Little Rock and Pine Bluff was very much hampered, and it was not until May 13 that the Cotton Belt resumed service on its branch between these two points. On May 14, the Missouri Pacific resumed service into Helena, which

Y. & M. V. Tracks Just North of Passenger Station, Vicksburg

had been cut off from railway service for some weeks, and, on May 13, the first passenger train was run over the main line of the Missouri Pacific from New Orleans to St. Louis via McGehee, Ark.

The situation in northeastern Louisiana was further

aggravated by four breaks in the Mississippi river levee system, in the vicinity of Waterproof, La., and Glasscock. This completed the inundation of northeastern and central eastern Louisiana, which is still largely under water. The line of the Missouri Pacific, running close to the river to Ferriday, La., through Vidalia, and the line of the Texas & Pacific from Ferriday south to its main line were put out of service, as were 75 miles on the main line of the Vicksburg, Shreveport & Pacific, between Delta Point, La., the car ferry landing opposite Vicksburg, and Monroe, La.

In the meantime, the Red river rapidly reached a dangerous flood stage and its levees proved insufficiently strong at several points, resulting in flooding the main line of the Texas & Pacific, 40 miles south of Shreveport, La., and the inundation of practically the entire line of the Louisiana Railway & Navigation Co., west of the Mississippi and east of Shreveport. The Texas & Pacific main line is still under water in places, but service through to Shreveport has been resumed and trains are no longer detoured over the branch line, as was necessary for some weeks.

Louisiana Southern's Entire Operation Affected

The Louisiana Southern, the main line of which was cut by the artificial crevasse at Caernarvon, has a line which follows closely the eastern bank of the Mississippi from New Orleans south to Pointe a la Haché, 45 miles. It has in addition a branch from Poydras to Shell Beach on Lake Borgne, 16 miles, and a 5-mile extension southward from Pointe a la Haché to Bohemia. The line was leased to the Gulf Coast Lines from 1911 to 1923, but since the early part of the latter year has been operated independently by its owners.

Since the beginning of its independent operation, the management has devoted intensive efforts toward developing the area the railroads serves and the road has been earning a return on the investment after many years of losses. There are two main sources of traffic —industrial plants and truck gardens. The territory is extremely fertile and, it is believed, with proper oversight and marketing could grow greatly in prosperity from an agricultural standpoint alone. The company, through its industrial development department, has put forth the greatest effort to aid the growers. It was found, for instance, that prices in the New Orleans market are low and that to secure adequate profits the produce should be moved to more distant centers. The railroad investigated the position of the products of this area in central markets, such as New York, Cleveland and Chicago, and found that the prices which were being received were comparatively low, due to improper packing. As a remedy for this situation the railroad has proposed to organize a company, which it would own, to handle the packing of this produce for shipment, rejecting all but the best grades of vegetables. This step would tend to make the activity of the growers more profitable and should have an important effect on increasing the tonnage of high grade traffic on the railroad.

In addition to the effort which the company has made to aid its agricultural shippers, it has also extended added facilities to the industries on its line, to which improvement these industries have responded by providing more traffic for the railroad. The road offers along its line a deep water industrial frontage of 45 miles, saving vessels bound for the port of New Orleans the tortuous journey up to the city proper. In short, the company has devoted its entire resources in an intelligent effort to build up the territory which it serves in a manner to add to the fortunes of the population and, incidentally, to bring the railroad an increased remunerative traffic.

When the artificial crevasse at Caernarvon was first proposed, the company objected strenuously to it, taking the view that from an engineering standpoint alone, a break in the levee above New Orleans and on the west side of the river would have provided the same relief from high water as a break in the Poydras zone and, at the same time, would have decreased the velocity of the flood waters through New Orleans, thereby diminishing the danger of bank erosion. Moreover, as it happens, the break of the flood waters into the "sugar bowl" area has flooded lands which would have been inundated by an artificial break above New Orleans. Caernarvon crevasse, therefore, in the view of the company, has resulted in unnecessary damage to a large and fertile area.

The state stands pledged to pay for the damage to property caused by this inundation. The actual physical damage to the line of the Louisiana Southern is expected to be relatively small. The 1926 crop, however, is ruined and the road will necessarily, therefore, lose a great deal of high class traffic, for which also compensation will be required if the property is to continue in operation and develop the area as it has started to do. The inundation of a large area is in itself extremely discouraging to the industries and individuals affected and the company's future as well as that of the area which it serves rests upon the hope that this discouragement may not be augmented by any backwardness on the part of the state of Louisiana to make good in full the losses, actual and intangible, inflicted voluntarily in order to save the city of New Orleans.

It is pointed out that the flood in this area is of no considerable depth. At Brathwaite just below the levee break the E-Z-Opener Bag Company, a manufacturer of paper, and the Brathwaite Mills have avoided all damage by small levees, but 4 ft. in height, around their properties. It is felt that in view of the enormous losses of this flood effective steps will be taken to prevent a repetition of the disaster in the future.

The P. R. R. Is Applying Keystone Number Plates on Its Locomotives

Shippers Desire to Intervene in Western Wage Hearing

Economist compares earnings and productivity of rail employees with workers in industries

THE latest development in the hearings which have been in progress for several weeks before the board of arbitration on the application of the Order of Railway Conductors and the Brotherhood of Railroad Trainmen for increases in pay of one dollar per day, was the attempt of the Illinois Manufacturers' Association to participate in the controversy. C. H. Fyffe, attorney for the association, asked permission to intervene and express the attitude of its 3,000 members, but the board held that inasmuch as this is an arbitration between a group of carriers and their employees, it has no right under the law to admit other parties to the controversy.

This request was made during the testimony of J. L. Jacobs, a member of the firm of J. L. Jacobs & Co., engineers and statisticians, who testified on behalf of the carriers to show that the conductors and trainmen on the western roads are better off with their present wages than they were in 1920 from the standpoint of actual purchasing power. He also compared the compensation and productivity of this class of employee and workers in industries.

The hearings before the board were started on April 27 when the employees presented testimony to show increased productivity and responsibility of the men. (*Railway Age*, May 7, page 1395.) On May 9 the carriers' witnesses took the stand to show that the earnings of the western roads were such that they are unable to bear the increases and that the increased productivity argued by the employees has inured to their benefit. (*Railway Age*, May 14, page 1445.)

When this issue of the *Railway Age* went to press, the hearings were expected to end on May 20 with the presentation of the rebuttals. These were heard on Thursday and Friday and will appear in the *Railway Age* of May 28.

G. H. Warfel Shows Casualties Decrease

On May 11, George H. Warfel, assistant to the general manager of the Union Pacific in charge of safety, presented testimony on the marked decrease in casualties among employees as shown by the reports of the Interstate Commerce Commission. In 1907, he said, the casualties on all railroads resulting from collisions totaled 10,317, while in 1925 there were only 1,879. In 1917 the fatality rate per 1,000 men on duty was 4.23, while in 1926 it was 2.08. The injury rate for the same years had been reduced from 137.68 to 89.99.

The casualty rate for the western territory in 1917 was 135.84 and had been reduced to 77.91 in 1926 and in the eastern territory it had been reduced from 144.95 in 1917 to 99.11 in 1926. In the western territory the casualty rate per million man-hours of exposure of trainmen on duty on Class I railroads was reduced from 36.90 in 1922 to 30.22 in 1926, while in the eastern and southern territories scarcely any reduction was made in the rate during those five years.

He also described the campaign carried on in recent years under the sponsorship of the Safety Section of the American Railway Association for the prevention of accidents and for the reduction of casualties.

J. L. Lancaster Testifies

On May 12, J. L. Lancaster, president of the Texas & Pacific, testified that with net earnings far below the "fair return" level contemplated by the Transportation Act and confronted with continual reductions in freight rates, his road is not now in a position to increase its payroll rates and, under existing circumstances, any increase in wages which it might be forced to grant at this time would be as manifestly unfair as it is unwarranted, either on a living cost basis or from any conditions of employment. The average annual return on investment during the six-year period 1921 to 1926 was 3.64 per cent, while the maximum return in any one year amounted to 4 per cent, which was earned in 1926. Notwithstanding expenditures of more than $24,000,000 for improvements during this same six-year period, the net return to the company remains far below a fair return on the investment prior to this additional expenditure, the 1926 net earnings amounting to only 5.05 per cent on the investment as of January 1, 1921.

While the Texas & Pacific, he said, has expended over $24,000,000 for improvements during the last six years, the line has been practically rebuilt, both as to roadway and equipment, under a program inaugurated in 1916. During the eleven years 1916-1926 more than $40,000,000 was spent for improvements chargeable to capital account, in addition to a large sum required to overcome deferred maintenance and to raise the physical standard of the property. These expenditures have resulted in improved service to the public, have reduced operating costs, and have redounded in many ways to the interest of the employees in improved working conditions and in greater safety.

He showed that on his road during 1926, an average of 4.8 injuries was sustained by employees in train and yard service per 100,000 man-hours, while during federal control, there were 9.4 injuries per 100,000 man-hours. In 1918 there were 9.1 injuries per 100,000 man-hours; in 1919, 9.8; in 1920, 10.8; in 1921, 7.9; in 1922, 7.1; in 1923, 6.9; in 1924, 6.7; and in 1925, 5.8. The reductions which have been made in the number of train accidents per million car miles are a further indication of the benefits accruing from improved roadway and equipment.

Mr. Lancaster said that while the average length of trains operated has increased, the clerical and supervisory work required of trainmen has been reduced, especially since 1918, prior to which time conductors were required to compile wheel reports. Since 1920 passenger conductors have been relieved of the duty of counting and classifying their tickets, which consumed from 45 min. to an hour, their reports to the auditor and treasurer now requiring only 10 or 15 minutes' time.

Employees Better Off Than in 1920

J. L. Jacobs, economist, and a member of the firm of J. L. Jacobs & Co., engineers and statisticians, testified

that when the purchasing power of the dollar is considered, the train and yard service employees of the western railways are from 8 to 17 per cent better off with their present wages than they were in 1920, when the peak wage scales were in effect. From 1920 to 1926, the average annual wages of these men declined less than five per cent, while from June, 1920, to December, 1926, the cost of living decreased 19 per cent, and from December, 1920, to December, 1926, the cost of living decreased 13 per cent. As a result of these falling costs, western train and yard service employees with their present average earnings were able, in December, 1926, to purchase eight per cent more goods than they could in December, 1920, and 17 per cent more goods than in June, 1920. For certain classes of these western train service employees, purchasing power in December, 1926, was as much as 29 per cent higher than in June, 1920.

These figures, he said, are based on the average cost of living in the United States as a whole and are an under-statement, as the cost of living in the west is now relatively lower than in the remainder of the country. From the peak level of June, 1920, to December, 1926, the decline in the cost of living has been seven per cent greater in the west than in the east and two per cent greater in the west than in the south.

He showed that while the wages of these train and yard service employees in the west are now less than five per cent below the post-war peak reached in 1920, the wages of clerical and station employees are from 7 to 17 per cent below the 1920 peak; the wages of maintenance of way employees are from 11 to 22 per cent below the peak; those of maintenance of equipment employees, from 13 to 25 per cent below; those of telegraph department employees, from 6 to 7 per cent below; those of steam and boiler room employees, from 8 to 14 per cent below; and those of signal department employees, from 11 to 17 per cent below the 1920 crest.

The average annual compensation of the various classes of train and yard service employees on the western lines in 1926 based on an analysis made by Mr. Jacobs, is shown in Table I.

Table I—Average Annual Compensation of Railroad Employees

Road passenger conductors	$3,161
Assistant road passenger conductors and ticket collectors	2,449
Road freight conductors	3,245
Road passenger baggagemen	2,399
Road passenger brakemen and flagmen	2,249
Yard conductors and yard foremen	2,485
Yard brakemen and yard helpers	2,273
Switch tenders	1,701

The average weekly earnings of the western train and yard service employees in 1926 ranged from $32.71 for switch tenders to $62.40 for road freight conductors as compared with the average weekly earnings in various lines of industry in December, 1926, as shown in Table II.

Table II—Weekly Earnings of Industrial Employees

Iron and steel	$31.08
Automobiles	28.70
Car building and repairing	30.25
Cotton goods	16.50
Hosiery and knit goods	19.26
Woolens and worsteds	23.00
Silk goods	21.25
Men's clothing	23.93
Leather manufacturing	25.40
Boots and shoes	21.65
Paper and pulp	27.20
Cigars and cigarettes	18.64

The higher wage rates paid in certain of the building trades, said Mr. Jacobs, are offset by the great irregularity of employment. On the basis of 306 working days a year, building laborers, the most favorably situated class as regards regularity of employment, are employed, on the average, only 91 per cent of the time, or 277 days a year. Electricians average 216 days, plumbers 200 days, lathers 190 days, painters 182 days, plasterers 170 days and iron workers 150 days. The average for the entire industry is only 189 days of work a year or 62 per cent employment.

Western train and yard service employees in 1926 received an average annual compensation of $2,629, while the average manufacturing wage in the Seventh Federal Reserve district was $1,376. Factory labor received an average of $1,490 in Illinois, and 1,335 in Wisconsin. The average pay of municipal employees was $1,912 and of electric railway employees $1,509.

The productivity of train and engine service employees has shown an increase of 13 per cent in 1925 as compared with 1919, while in all manufacturing industries there has been an increase of 41 per cent per man. In this period, the output per person engaged has increased 21 per cent in the lumber industry; 38 per cent in iron and steel; 40 per cent in paper and printing and allied industries; 43 per cent in food and kindred products; 53 per cent in the chemical industry; 99 per cent in the rubber industry; and 120 per cent in the manufacture of vehicles for land transportation.

L. W. Baldwin Testifies

On Monday L. W. Baldwin, president of the Missouri Pacific, said that the application now before the board affects 4,768 train and yard service employees on the Missouri Pacific lines. If a wage increase of 7½ per cent is granted to these employees, this will increase the annual payroll, on the basis of 1926, by a total of $851,405. If a similar increase were made to all classes of employees, the total wage increase would amount to $5,822,666 per year for the Missouri Pacific lines.

Dividends, he continued, are payable on the preferred stock of the Missouri Pacific at the rate of five per cent, cumulative from June 30, 1918, but no dividends have been paid on this preferred stock since the formation of the new company on June 1, 1917, and the accumulated unpaid dividends to June 30, 1927, amount to 45 per cent or $32,000,000. The last dividend paid by the former Missouri Pacific Railroad Company was a stock dividend of 2½ per cent, amounting to $1,935,210, paid June 30, 1908.

The cost of the additions and betterments which have been made to the properties of the Missouri Pacific lines since federal control amounts to $106,000,000 for the Missouri Pacific, $12,000,000 for the International-Great Northern, and $11,000,000 for the Gulf Coast Lines. These figures were given to indicate the amount of new money that has had to be applied to furnish the class of service the public demands. This enormous expenditure is net, after all retirements are properly accounted for, and there is still urgent need for additional capital outlays by these railroads as well as other railroads in that section.

New and improved units of equipment of a larger type and of modern construction are being demanded by the shipping public and must be furnished to meet the demands of the present day. Forty-six per cent of the amount invested in equipment on the Missouri Pacific today has been applied during the last seven years.

He testified that since federal control there have been many demands for increased wages. The cost of materials and supplies has also maintained to a large degree the high levels of 1920, while freight rates have declined. To illustrate the extent of freight rate reductions that have been made in recent years, he stated that had his road been compensated in 1926 on the same basis per ton-mile as in 1921, the gross freight revenue in 1926 would have been substantially $20,000,000 greater than it was. Further, the number of passengers carried has

declined from 15,000,000 in 1920 to less than 6,000,000 in 1926 on the Missouri Pacific, while the reductions in the same period have been from 1,800,000 to 700,000 on the Gulf Coast Lines, and from 2,200,000 to 700,000 on the International-Great Northern.

Increase Will Amount to $12,262,000

L. C. Fritch, vice-president of the Chicago, Rock Island & Pacific, showed that the granting of a 7½ per cent increase in wages to the conductors, trainmen and yardmen of the western railways would result in an annual increase of $12,262,000 in the wage bill of the western lines, while if a similar increase were granted to all other employees with the exception of the officers, such action would increase the total payrolls of the western roads by $83,155,000 yearly. He also gave figures to demonstrate the effect of a 7½ per cent increase to train service employees and to all employees on the annual payroll of several western carriers. These are shown in Table III.

Table III—Amount 7½-Per Cent Increase Will Add to Payrolls

Railroad	Train service employees	All employees
Southern Pacific	$1,411,740	$10,166,803
Illinois Central	1,019,426	6,830,692
Chicago, Milwaukee & St. Paul	952,828	6,222,984
Atchison, Topeka & Santa Fe	911,392	7,494,310
Chicago, Burlington & Quincy	899,471	5,914,005
Chicago & North Western	870,546	5,458,486
Union Pacific	852,701	6,129,630
Missouri Pacific	737,068	4,545,620
Chicago, Rock Island & Pacific	685,395	4,379,031
Great Northern	518,981	3,504,763

On cross examination he also stated that the freight revenue ton-miles on the Rock Island system amounted to 7,475,439,000 in 1923 and 7,912,863,000 in 1925. In 1923 there were 705 freight conductors and in 1925, 605. In 1920 the average train on the Rock Island consisted of 20.49 loaded cars and 9.19 empty cars or a total of 29.68 cars, while in 1926 it was made up of 24.47 loaded and 13.61 empty or a total of 38.08 cars. The gross tons per train increased 520 tons between 1913 and 1926. The net train load increased from 356 in 1913 to 537 in 1926 or 181 tons. Total operating revenue amounted to $141,946,973 in 1920, decreased to $125,086,233 in 1922, and increased to $137,911,415 in 1926. On redirect examination he testified that with a 7½ per cent increase the payroll would be increased from $2,919,354 to $4,379,031 which is 25 per cent of the net revenue for 1926.

Duties of Trainmen Less Than in 1887

W. F. Thiehoff, general manager of the Chicago, Burlington & Quincy, testified that the wages paid to trainmen on his road in 1921 were 12.12 per cent of the total wages paid to all employees, while in 1926 trainmen received 15 per cent of the total. He also outlined the duties of trainmen in 1887 as a contrast to their present duties.

He said the ratio of the wages of conductors, brakemen, yardmen and switch tenders to gross revenues on the Burlington was 6.13 per cent in 1921 and 6.61 per cent in 1926. With a 7½ per cent increase it would be 7.106 per cent. The property investment of the Burlington increased from $447,000,000, the average of the three years ending June 30, 1917, to $580,000,000 in 1926. Net earnings, in this same period, decreased approximately four million dollars, the net return earned in 1926 amounting to only 4.9 per cent.

He said that his own experience in the duties and responsibilities of conductors and brakemen contrasts strongly with present-day requirements and practices.

"I entered the train service in 1887 as a freight brakeman, receiving about two cents a mile in wages, with no overtime payments. My monthly earnings were approximately $56. I drew links, pins, chains, waste, oil, flags, lamps, and similar train supplies from the storehouse, carried them in a wheelbarrow and stored them in the caboose. During layover time, I cleaned the caboose floor and windows without compensation. I reported for duty from 30 minutes to an hour before the leaving time of my train, assisted the conductor in taking a record of door fastenings and seals, examined all couplings, and inspected, released and adjusted the hand brakes on the cars.

"The responsibility for the control of the train rested with the train crew in those days. It was necessary to keep constant watch, locating the approach to stations and fuel and water supply points by landmarks, so the train could be stopped by the hand brakes. The locomotives then had small water and fuel capacity, so stops were frequent. With these many stops and the necessity for regulating speed on down grades, the brakeman had to ride on top of the train from a quarter to half the entire time, regardless of weather conditions.

"We coupled and uncoupled all cars with link and pin, as there were no automatic couplers. We repaired and packed journal boxes when they ran hot; we replaced draw bars or chained cars together when the couplings broke, to take the cars to their terminal, instead of setting them out en route for repairs as is now done. When it was necessary to protect our train at a stop, we frequently had to go a mile or more back, in all weather, to flag a following train, to make it possible for them to stop in time with their hand brakes.

"As a freight conductor, I served under the same conditions. When called for a trip, I usually reported one hour before the leaving time of my train. I took the initial and number of each car, together with a record of the door fastenings and seals of all loaded cars, checked these with the yard clerk and compared them with the bills for each car, making a record of station billed to and from, and junction points where received or to be delivered. I recorded the contents of loaded cars and kind and weight of empty cars, reporting from this record to the chief dispatcher. I made advance reports of all cars of livestock to fill out or feed, and any cars of perishable products that required re-icing en route. I compared my watch (which I bought myself) with the clock in the dispatcher's office, checked the register for all scheduled trains due, checked bulletins, registered number of train and engine, number of cars and weight, on the train register, compared time with the engineer, read the orders to him, and informed him and the brakemen of any work en route. On arrival at the terminal, I registered the arrival of the train, delivered the bills to the yardmaster, made a wheel report record for the car accountant of every car handled on the trip, with a complete delay report for the trainmaster, a telegraph and written report of any accident, and a ticket report for any train that carried passengers.

"As a passenger conductor, I performed all the duties referred to as freight conductor that pertain to passenger service. With my contact with and personal knowledge of train service then and now, it is my judgment and opinion that the duties and responsibilities of conductors and trainmen are much less arduous and much less hazardous now than formerly."

F. W. Sargent, president of the Chicago & North Western, testified that in 1923 the company was obliged to reduce its dividend to 4 per cent on its common stock, but this has left substantially no surplus as a margin of safety. Any substantial increase in wages would wipe out the entire surplus which the company had in 1926 over the 4 per cent dividend. This, he said, presents a very serious situation and a critical threat to the credit of the company. The failure to pay a 4 per cent dividend in any year would make the bonds unavailable for investment under the savings bank and trust laws of the eastern and some of the western states and would seriously cripple the ability of the company to proceed with additions, betterments and expansions so essential to the welfare of the middle west and the efficient service upon which the prosperity of the farming and manufacturing industry is clearly and vitally dependent. The employees have already shared far better from the earnings of the company than the owners have shared.

The total investment in the road amounts to $10,000 per employee in service and, since 1916, the company has invested in the property for additions and betterments the sum of $131,000,000, but the net railway operating income earned in 1926 was $5,400,000 less than it was before these investments were made. These additions and betterments were made for things that

looked to greater efficiency and greater safety for the men. So far as returns are concerned, the employees, who are the only ones who have received the direct benefit, for the owners of the railway property are receiving less net returns now than before the improvements were made. Not only have the working conditions of the employees been very greatly improved but in the same time their wages have been very materially increased.

In 1916, the average wages of a passenger conductor amounted to $1,976 per year, while this had been increased to $2,881 in 1926. In 1916, the company operated 52,501 passenger train miles per man and in 1926 there were 50,882 passenger train miles operated per man, so that for the increased wages the service rendered per man was reduced. In 1916, the average yearly earnings of freight conductors were $1,728 while in 1926, they were $2,854. This is an increase of 65 per cent, but in 1916, freight train miles run per man were 28,063 and, in 1926, 25,691 so that with an increase of 65 per cent in average annual earnings the freight conductors performed 8 per cent less service measured by freight train miles run per man. Even under the existing scale of compensation and costs of operation the situation of the carriers in western trunk line territory is critical. To intensify this situation by increases in wages at this time would mean to add not only unbearable burdens upon the carriers in western trunk line territory but upon shippers and the public as well. One thing is certain: The carriers cannot survive under such increases without material increases in rates which would have to be paid by the farmers and agricultural interests as well as the shippers of other products. The evils resulting from increases will be measured by a further curtailment of railroad improvement, less efficiency in service and a depriving of all classes of railway employees of stable employment, which will inure to their detriment. If this be not so, it can only be overcome by very substantial increases in rates, which would be a further burden upon the general shipping public, including agricultural interests.

Must Increase Freight Rates 5 Per Cent

On Wednesday, K. F. Burgess, general solicitor of the Chicago, Burlington & Quincy, submitted exhibits to show that western railroads would have to raise their freight rates 5 per cent to offset an increase among all employees of 7½ per cent or $83,000,000. This total amount and this necessary percentage of increase in freight rates, he said, are just about the same as the freight rate increases sought by the western railways in 1925 and 1926 and finally refused by the Interstate Commerce Commission. If a wage increase of 7½ per cent is granted to the western train service employees alone a freight rate increase of about 1 per cent, amounting to more than $12,000,000, would be required to offset this annual increase in the total wage bill. From 1915 to 1926 the total compensation of those employees included in the present hearings has increased from $52,000,000 to $152,000,000 a year, a relative increase far greater than has occurred in the same period in the gross revenues of the western lines. As a result the ratio of the total wages of the conductors, trainmen and yardmen of the western railways to the gross operating revenues of these lines has increased from 4.42 per cent in 1915 to 6.48 per cent in 1926. From 1920 to 1925 the ratio of the total compensation of all employees on the western roads, excluding the employees affected in this case, to gross operating revenues declined from 48.10 per cent to 38.13 per cent. In this same period the ratio of the total compensation of train service employees to the total compensation of all employees increased from 14.37 per cent to 17.22 per cent.

Per Diem Education

THE Southern Pacific has inaugurated a campaign for per diem education to obtain increased results from car handling. As to the inception of the idea, O. C. Castle, superintendent of transportation of the Texas lines, writes as follows:

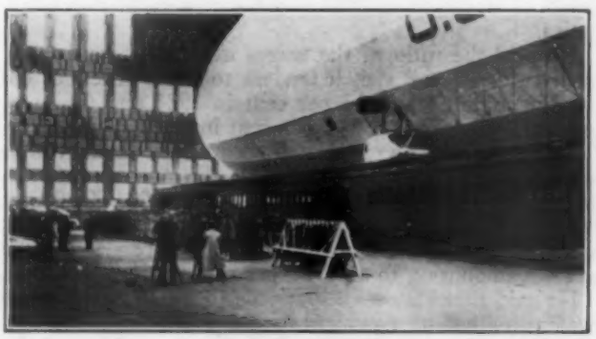
"The suggestion contained in your editorial of January 22nd on the Significance of Per Diem reminded me that while we have from time to time carried on intensive campaigns for improvement in car handling, we have taken rather for granted that the employees understand what it is all about. It is so easy to overlook the fact that the personnel is constantly changing, particularly among trainmen, yard clerks and station forces who really have more to do with creating a per diem balance than division and general officers."

A per diem primer has been compiled by Mr. Castle and distributed among interested employees which contains a number of pertinent questions and answers. This is followed by mimeographed leaflets giving the latest figures for per diem received and paid, so that in addition to knowing what per diem is, the employees will understand its status on their railroad.

The following are some of the questions asked and answered in the per diem primer:

Who pays per diem?
Who receives the per diem paid?
Why does the railroad use foreign cars?
How do cars get back to their owners?
Does per diem apply on empty movements?
Does it apply when the car is standing still?
When are per diem settlements made?
What is meant by debit and credit per diem balance?
How can a railroad avoid a debit balance?

ELECTRIFICATION of the Canadian National between Halifax, N. S., and St. John, N. B., is a possibility. This was indicated at Moncton, N. B., recently by Sir Henry Thornton, president of the C. N. R., in a speech. He announced that a director of the Canadian National had gone to New York in connection with the proposed tidal power development on the Petitcodiac river. He said that engineers would investigate the feasibility of the development with a view to electrifying the Canadian National between Halifax and St. John.



Underwood & Underwood

U. S. Marines Entraining for China in "Los Angeles" Dirigible Hangar, Lakehurst, N. J.

Rail Transportation Has Opened Large Areas for Vegetable Cultivation

Economic Advance of South Sped by Railroad Development*

Gulf ports attain greater importance through freedom from total dependence on inland waterways

By George M. Crowson
Assistant to the Vice-President, Illinois Central

WITHIN three years from the time the first steam locomotive was successfully used in England, ground was broken in Maryland in 1828, for the first railroad for public use in America, the Baltimore & Ohio. No people were quicker to embrace and develop this new form of transportation than the people of our southern states. The introduction of the cotton gin had greatly stimulated the production of cotton, and with an abundance of land and slave labor the great problem of the southern planter was that of transportation in the interior. The railroad offered the solution of that problem.

In 1830, the Pontchartrain railroad, a four-mile line between New Orleans and Lake Pontchartrain, was put in operation. It was the first railroad in the Mississippi valley. The following year two other railway companies were incorporated in the Mississippi valley—the West Feliciana railroad, between St. Francisville, La., and Woodville, Miss., and the Clinton & Vicksburg railroad, entirely in Mississippi. Both of these road are now parts of the Illinois Central. Incidentally, it is interesting to note in passing that the West Feliciana had the distinction of being the first interstate railroad and the first standard-gage railroad in America.

In 1830, the southern states had a population of five and three-quarter million. Nearly two-thirds of these people lived in states bordering on the Atlantic. There are more people living in New Orleans today than were then in Louisiana, Mississippi and Arkansas combined.

Early Railroads Confined to Seaboard

Because of this uneven distribution of population, railway development in the South between 1830 and 1850 was confined very largely to the states bordering on the Atlantic seaboard. In 1850, 20 years after the first railroad was opened in the South, these seaboard states had 1,650 of the 2,058 miles of railroad in the southern states. Alabama, Kentucky, Mississippi and Louisiana each had about 75 miles of railroad, but these short lines were poorly equipped, and they were of little economic significance.

The decade between 1850 and 1860 was a period of great railway development in the South, especially in the Mississippi valley. During this ten-year period, the South's railway mileage increased more than 400 per cent —from 2,058 to 10,639 miles. In the six southern states bordering on the Mississippi river railway mileage increased more than 1,500 per cent—from 233 to 3,839 miles. Louisiana increased its railway mileage from 80 to 335 miles; Mississippi from 75 to 862 miles; Kentucky from 78 to 534 miles; Tennessee, which had no railroad in 1850, had 1,253 miles of completed lines in 1860. In

*Abstract of an address delivered before an assembly of students of the Louisiana State University, Baton Rouge, La., on April 1, 1927.

the southern states west of the Mississippi river an equally remarkable growth took place. Missouri, Arkansas and Texas lacked railway facilities entirely in 1850, but in 1860 they had altogether more than 1,100 miles.

It may be well to consider for a moment the economic status of the South as a whole in 1850, when this period of great railway development began. The southern states then had a population of 9,511,000. Four of these states—Virginia, North and South Carolina and Georgia—together have more than that many inhabitants today. The value of all real and personal property in the southern states as a whole in 1850 was less than the value of property in Alabama alone at present. The per capita wealth of the South was $306 in 1850, compared with $1,821 today. The value of all the farms in the South was around $1,100,000,000 in 1850. The farms of Oklahoma alone are worth more than that now.

Cotton Chief Crop in 1850

In 1850 the southern states produced 2,136,000 bales of cotton. Texas alone produced nearly three times that much last year. Cotton was the chief source of revenue of southern farmers in 1850. The value of all other southern farm products last year was around $2,300,000,000. Although mining in 1850 was confined almost entirely to coal, the South as a whole produced only about 865,000 tons. The annual output of coal in Kentucky alone is more than 60 times that much now. The value of all manufactured products in the southern states was $161,000,000 in 1850. Florida alone does manufacturing of greater value than that now. The value of the South's cotton manufactures in 1850 was about one-sixth that of Louisiana's alone at the present time.

The remarkable development which has taken place in the southern states since 1850 has been largely due to the vast and well-distributed system of railroads that has been built up within their borders. But this development was brought virtually to a standstill by the war between the states. In the decade from 1850 to 1860 railway expansion was more than twice as great in the southern states as in the remainder of the United States. In the two decades from 1860 to 1880, however, the remainder of the United States outstripped the South nearly two to one in railway construction.

In this connection, it is worth while to note that one of the great benefits of railway development is its contribution to national unity. Many students of our times have expressed the opinion that if the intersection development of our railroads had taken place 20 or 30 years earlier, the Civil War might never have occurred.

Beginning with 1880, the South again took the lead in railway and economic expansion, and in the 45 years from 1880 to 1925 railway construction in the southern states was twice as rapid as it was in the remainder of the country. Since 1880 the railway system of the South has grown from fewer than 25,000 miles to more than 90,000 miles, an increase of 264 per cent. Few states in the Union have enjoyed a more remarkable railway development than Louisiana. Railway mileage in this state has increased from 652 miles in 1880 to 5,100 miles today, a gain of 682 per cent. The southern states as a whole now have one-eighth of the total railway mileage of the world and more than the entire country had in 1880.

Foreign Trade Advance at Southern Ports

What has been the result of this great development of the South's transportation facilities? In less than a half-century the aggregate wealth of the southern states has increased nearly seven times. The value of farm property has increased four and one-half times. The value of farm products has increased nearly seven times. Lumber production has more than quadrupled. Capital invested in manufactures has been multiplied nearly 20 times. The value of manufactured products has multiplied nearly 14 times. The foreign trade of southern ports has multiplied nearly seven times. Bank deposits have increased 36 times. Expenditures for public schools have increased 28 times.

The most remarkable feature of the economic development of the South in the last half-century has been its industrial growth. Transportation is an absolute essential in manufacturing and without it no industry can survive. The industrial transformation of the South, which now has more than 37,000 industrial plants and produces between nine and ten billion dollars' worth of manufactured products annually, has been due very largely to the facilities of transportation provided by the railroads.

Transportation is likewise a factor of first importance in the development of mineral resources. Remarkable strides have been made in the South in that direction. In 1925 the southern states produced more than one and one-half billion dollars' worth of mineral products. That was more than was produced in the entire country in 1900. In these 25 years the southern states increased their mineral output nearly four times as rapidly as did the remainder of the country. Without the transportation provided by the railroads, the rich coal, iron and phosphate mines of the south would not be yielding up their wealth in such abundance today.

Before the coming of the railroads, cotton and such other marketable commodities were transported to water largely by the aid of oxen. A description of conditions in those times was recently found in a newspaper published in Mississippi more than three-quarters of a century ago:

"Some idea of the expense of this (ox-drawn) movement may be formed by those who have seen cotton coming over dreadful roads, up to the hub, dragged slowly along, 20, 30 or 40 miles, as we have seen it coming into Vicksburg, hauled by five yoke of oxen carrying 2,800 to 3,000 lb., so slowly that motion was scarcely perceptible. So many oxen perish in the yoke in winter and spring that it has been said, with some exaggeration, that one might walk on dead oxen all the way from Jackson to Vicksburg."

What the railroads have meant to southern agriculture is apparent to everyone. Fertile territory remote from navigable water has been opened up, and the area of agricultural activity is today as vast as the South itself. Through the development of industrial and consuming centers, home markets for farm products have been built up. For the farmer the railroads have created numerous markets and brought the world to his door. Fast, reliable, cheap transportation has widened his opportunities and made it possible for him to produce numerous crops that he could not otherwise cultivate with profit. Tangipahoa and adjoining parishes in Louisiana are famous for their strawberries. Refrigerator cars are operated on fast schedules to deliver Louisiana strawbarries in Chicago, Indianapolis, St. Louis and other northern markets within 48 hours from the time they are loaded. Likewise, vegetable growers are provided with fast refrigerator service in the northern markets. The rapid transportation to distant markets of many other perishable farm products, such as fruits, milk, butter, eggs, poultry and so on, is a service which adds millions of dollars annually to the income of the farmers of the South. And it is a service that could not be performed satisfactorily by any other means of transportation.

The growth of both foreign and domestic commerce

through southern ports is another important phase of the South's remarkable economic progress. There were many persons who predicted dire things for New Orleans when commerce on the Mississippi river began to wane. They thought the greatness of New Orleans was at an end. But railway transportation has made of New Orleans a vastly greater port than it could have become if it had remained chiefly dependent upon the Mississippi river for its contact with the interior. The value of exports from New Orleans has quadrupled since the beginning of the century, and the value of imports has increased more than 11 times in the same period. Today New Orleans ranks second only to New York in foreign trade. The railroads, with their extensive network of lines reaching back into the rich agricultural and industrial regions of the country, have been powerful factors in the development, not only of New Orleans, but of all southern ports.

Southern Railroads Employ 600,000 Wage Earners

As another contribution to the economic development and the prosperity of that section approximately 600,000 wage earners are employed by the railroads in the southern states, and the payrolls amount to around one billion dollars annually. Their purchases of coal, iron and steel products, lumber, ties, poles, petroleum products, cement and many other southern products run into hundreds of millions of dollars annually.

The railroads make still another sizable contribution to the South through the taxes they pay and their large tax payments have the effect of reducing the tax burden of all other property owners. In 1926, the railroads paid in the neighborhood of $72,000,000 in taxes in the southern states. A large part of this sum went into the construction of highways and other public improvements and to the support of public schools. Out of $2,513,000 paid in taxes by the Illinois Central in one year, $371,000 went to the support of county and district schools. There were then 13 counties in Mississippi in which the Illinois Central System was the principal taxpayer, and in these 13 counties there were 18 school districts in which the railroad paid one-half or more of all the school taxes levied, and in two of these districts the railroad paid more than 70 per cent.

Transformation Marked

When we take account of what has occurred in this country in the last century—of the stupendous agricultural, industrial and commercial development, of the place which our country occupies today in world affairs—we must marvel at the transformation. Marveling, we must be somewhat curious to know why it has come about.

Our nation is abundantly blessed with natural resources, but so are many other countries. This country has no monopoly of the world's supply of iron, copper, petroleum and other minerals nor of fertile soil and favorable climatic conditions. We must look farther than that for the answer to our question. Tribute must be paid to the remarkable efficiency with which we have organized and utilized our natural resources and in that connection the service rendered by our transportation system has played an important part. It is no mere coincidence that our nation is a leader among the nations of the world in railway transportation. We have only 5 per cent of the land area of the earth and only 7 per cent of the earth's population in this country, but we have 35 per cent of all the railway mileage of the world. America's complex economic system has been built up around the railroads. The service they perform is truly indispensable in our modern life.

Looking Backward

Fifty Years Ago

It is "semi-officially" announced that the trunk line railroads have agreed, commencing July 1, to pool all earnings on freight taken from New York to the West, the division to be on the basis of 33⅓ per cent to the New York Central, 33⅓ to the Erie, 24 per cent to the Pennsylvania and the remaining 9⅓ per cent to the Baltimore & Ohio. An arrangement on this basis should prove profitable to the railways and satisfactory to the shipping public.—*Railway Age*, May 24, 1877.

Illinois Central stock has advanced one-half in price since the investigation by the foreign stockholders. About April 1 the price was down to 40½ and now it is quoted at about 59. The delegates of the shareholders reported that the company had been too conservative in the policy of abstaining from forming lateral connections which might act as feeders for the main line. "It is evident," continued the report, "that the success of the railroad depends upon the commercial importance of its seaboard terminus; New Orleans, therefore, demands special attention."—*Chicago Railway Review*, May 19, 1877.

Twenty-Five Years Ago

J. A. Somerville has been appointed chief clerk in the general freight department of the Chicago, Burlington & Quincy at St. Louis, Mo. S. M. Rogers has been appointed purchasing agent of the Elgin, Joliet & Eastern, with headquarters at Chicago.—*Railway Age*, May 23, 1902.

When the Chicago, Rock Island & Pacific placed the Rocky Mountain Limited in service on May 18, it abrogated the speed agreement among the Chicago-Omaha lines, which made 13½ hours the minimum time. This new train runs from Chicago to Omaha in 13 hours and makes the return trip in 12½ hours. As an immediate means of protection the Chicago & North Western has attached a sleeper to its fast mail which covers the 500 miles in 11 hours.—*Railway Age*, May 23, 1902.

The directors of the Southern and the Louisville & Nashville have agreed to offer joint four per cent bonds of these companies for the capital stock of the Chicago, Indianapolis & Louisville at 78 for the common and 90 for the preferred. Hitherto the common expectation in financial circles had been that ultimately a union would be formed between the L. & N., the Evansville & Terre Haute and the Chicago & Eastern Illinois, leaving the Monon to be taken into a similar combination with the Southern.—*Railway Age*, May 23, 1902.

Ten Years Ago

President Wilson has asked Congress to give him authority to direct that certain kinds of traffic shall have preference of priority in transportation by rail or water during the war. The House of Representatives on May 9 passed without a roll call the bill introduced by Representative Esch conferring jurisdiction on the Interstate Commerce Commission over the subjct of car service.—*Railway Age Gazette*, May 18, 1917.

In order to solve the railway problem of the United States and avert the commercial crisis confronting the country the railroads must be allowed to charge freight rates sufficient to meet the advance in operating expenses and the multiple and conflicting systems of regulation which hamper operation must be replaced by one single federal regulatory agency, W. M. Acworth, English railway authority, told the Newlands joint congressional committee on Interstate Commerce at a special hearing at Washington.—*Railway Age Gazette*, May 18, 1917.

Communications and Books

Selling Tickets Through Scalpers

CHICAGO, Ill.

TO THE EDITOR:

As a regular reader of the *Railway Age* who has generally been in thorough accord with its policies and the opinions expressed in its columns, I was very much surprised to note that the issue of May 7 contains an editorial advocating that the railroads adopt the plan of handling ticket sales for which the theatres have become notorious. If this plan were carried to this logical conclusion, the visit of a prospective traveler to a station or city ticket office would result in a conversation about as follows:

"I want a ticket and a berth to Buffalo for tomorrow night."

"Yes, sir, I can give you Upper 12."

"Haven't you any lowers?"

"No, sir, I am sorry, they are all gone."

"What, do you mean to say that there are no lowers left for a train that doesn't leave until tomorrow night?"

"Well, it is possible that Lieberstein & Liberati up at the Ritzmore may have something."

Then follows a trip to the Ritzmore where the courteous attendant at the concession of Lieberstein & Liberati, advises that Lower 6 is to be had and the ensuing sale discloses that the price for Pullman space is 50 per cent higher than the published rate.

The earnest efforts of the railroads to live down the reputation of "public be damned" has led them to exercise scrupulous care to avoid the appearance of favoritism in the sale of Pullman space. Nevertheless, there are those who know how to get lowers, compartments or staterooms when the supply is ostensibly exhausted. I have no quarrel with the railroads on that score. It is good business to favor your friends—within reason. But if there is any plan through which the railroads can convince the public that Vanderbilt was right it is to follow the lead of the theatres in the sale of tickets.

DISGUSTED.

The Challenge of the Grade Crossing

NEW YORK.

TO THE EDITOR:

I wish to congratulate you and the author, Robert H. Ford, on the publication of his timely article on the railroad grade crossing problem in your May 7 issue. It goes to the very heart of the problem and, I note with pleasure, does not make the error of advocating greater federal control.

On the face of the discussion, perhaps, it would seem that greater centralization of authority is advocated, but a careful reading of the article discloses that the co-operation called for would be voluntary. If the states wish to accept federal aid, then they should conform to unifying standards to be set up for federal aid roads. There is no question here of a proposed Twentieth Amendment to the Constitution placing sole control of grade crossings in the hands of a paternalistic federal government. There will be inducements for all states to join in, but they will not be dragooned into the scheme.

I agree with the writer that manual protection such as we now have for highway crossings is often insufficient, but I do not agree with him that automatic warning devices are the best and surest protection. Why have we never utilized in this country the interlocked crossing gate? Such a gate should swing over the tracks and be interlocked with a railroad signal so that in the event of a motor vehicle being stalled on a crossing, the gate could not be closed and approaching trains would be halted by a fixed signal at "Stop." The gates should be so constructed as to bar all ingress to the tracks, vehicular and pedestrian, and strong enough to wreck the stoutest motor vehicle which would try to crash them. Careless driving is of course the most important cause of crossing accidents; but it is not, as sometimes seems to be assumed, the sole cause. Stalling of cars is an important contributor and "cross crossings cautiously" campaigns mean little to a balky motor.

Could the scheme of protection outlined be designed so it would never fail except in those rare cases when a train overruns a stop signal? Can any form of crossing protection, except complete elimination, promise as much? I do not think so.

Protection of this character would be somewhat more expensive than that now provided, but on crossings of heavy traffic where elimination can not yet be undertaken is not such protection needed—provided public authorities would share liberally, as they should, in the expense?

Is the richest country in the world to be balked by the expense necessary to eliminate a condition which kills or injures 10,000 of our citizens each year?

F. O. WALDROUS.

Books and Articles of Special Inrerest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Cape to Cairo. . . . by Rail, Steamer, Motor and Safari. Rhodes' project of an all-rail route has not yet been completed, but this booklet tells how the 7,181-mile journey can be made by a variety of transport in 45 days. 31 p. map. Pub. by South African Railways & Harbors, Johannesburg, S. A., but available in this country from South African Tourist Bureau, New York City.

The Conquest of Disease, by Thurman B. Rice. Reviews what has been done, and presents what can yet be done by communities, industries, and individuals toward eradication of disease, the monetary cost of which in this country alone is estimated at seven billion dollars annually. 357 p. Pub. by the Macmillan Co., New York City. $4.50.

The Co-operative Policy of the Railway Employees' Department, A. F. of L. Historical sketch and important aspects and and accomplishments of this policy. 35 p. Pub. by Railway Employees' Dept., American Federation of Labor, Washington, D. C.

Employee Stock Ownership in the United States, by Robert F. Foerster and Else H. Dietel. Quite a number of railroads are represented in the list of companies having plans and whose plans are summarized in this study. 174 p. Pub. by Industrial Relations Section, Princeton University, Princeton, N. J. $2.00.

Rules of Practice Before the Interstate Commerce Commission in Proceedings Under the Interstate Commerce Act. Revised, Amended and Adopted April 20, 1927. Includes approved forms. 63 p. Pub. by Govt. Print. Off., Washington, D. C. 10 cents.

Periodical Articles

The Developing Ozarks, by J. M. Kurn. How a section's latent wealth was tapped, the result being carloads annually of strawberries, grapes and other important marketables. Editorial comment p. 8. Executives' Magazine, 1st issue, May, 1927, p. 9-10.

Diesel Traction for Railroads, by William Arthur. Includes discussion of the financial and other advantages in Dieselizing railroads rather than electrifying. Mechanical Engineering, Mid-May, 1927, p. 581-586.

Leading Executives Comment on Hand-to-Mouth Buying. Interviews with H. A. Wheeler, E. A. Filene, Saunders Norvell, and Hal W. Brown, which contain comment on present transport services. Executives' Magazine, 1st issue, May, 1927, p. 10-11, 24.

A Railroad's Experience with Buses, by Arthur P. Russell. Conclusions of the New Haven. U. S. Investor, May 14, 1927, p. 42.

Sur la Locomotive de la "Flèche d'Or," by René Millaud. The "Golden Arrow" makes the Paris-Calais run of 185.2 miles [298 kilometers] in little more than 3 hours. This article describes the Pacific type locomotives of the trains "in action." Je Sais Tout, May, 1927, p. 129-132.

Odds and Ends of Railroading

The Argument Goes Merrily On; Who's Next?

When we speak of naming engines
We've no flappers on *our* mind.
Ton-miles call for horse power,
And mule power rates in kind.
We racked our brain and torqued it,
For a mule that all would laud
And our minds all categoried
Around Si Slocum's "Maud."

We, too, know our parsnips;
And admire R. E. and George,
Still maintaining a "her" complex
That we never will disgorge.
The railroad that employs us
Would have, long ago, been broke,
If we had tried to handle tonnage
With power composed of smoke!

J. B. Searles.

There has been much discussion on this page of late as to whether or not there is a railroad opera. Of course there is. How could we ever have overlooked "Carmen"?

Railway Model Enthusiasts in England

In England, apparently, there are enough railroad "fans" who are interested in models to justify their having an association and exhibiting their products. The Times (London) recently announced the "Annual Exhibition of the Model Railway Club at Kingsway Hall." The report reads:

"The annual exhibition of the Model Railway Club was held at the Kingsway Hall yesterday. On one side of the room, on a long track, was running a huge model of a Baltic tank engine of the London, Midland & Scottish Railway (Tilbury Section), worked by steam, with paraffin for fuel. There were trains of all sorts and sizes, from model locomotives large enough to haul several passengers, to engines small enough to be held on the palm of the hand, sections of railway lines, stations, including an excellent reproduction of Poplar Station signal boxes, and tunnels. A section of a complete railway, made by two brothers, included an underground station and a countryside station, the latter including level-crossing gates, a post office pillar box, and a white line for the guidance of motorists."

A Ride on a Piano

The New Zealand Railways Magazine claims that the follow- is a description "as told by Jem Nelson, one of America's oldest engine drivers" of his "ride on a piano":

"I was loafing around town last night and as I had nothing better to do I dropped into a concert and heard a slick looking Frenchman play a piano that made me feel all over in spots. As soon as he sat down at the piano I knew by the way he handled his work that he understood the machine he was running. He tapped the keys 'way down on one end, just as if they were gauges and he wanted to see if he had water enough. Then he looked up as if he wanted to know how much steam he was carrying, and the next moment he pulled open the throttle and sailed out on the main line as if he was half an hour late. You could hear her thunder over culverts and bridges and getting faster and faster, until the fellow rocked about on his seat like a cradle. The fellow worked the keys on the middle division like lightning and then he flew along the northern end of the line until the drivers went around like a buzz-saw, and I got excited. About the time I was trying to tell him to cut her off a little, he kicked the dampers under the machine wide open, pulled the throttle valve 'way back into the tender and how he did run. I couldn't stand it any longer and yelled to him that he was pounding on the left and if he wasn't careful he'd drop his ash pan. No one heard me. She went by the meeting point at a mile and a half a minute and calling for more steam. I knew the game was up. Sure enough, dead ahead of us was the tail light of a special. In a daze I heard a crash as the French professor struck the deep keys 'way down on the lower end of the southern division, and then I came to my senses. There he was at a dead standstill with the door of the fire-box wide open, wiping the perspiration off his face and bowing to the people before him."

An Appreciation of a Good Boss

When L. A. Downs left the Central of Georgia to assume the presidency of the Illinois Central, he took with him as a family servant his old porter, Sam. Two other porters were discussing the situation, and their remarks were transcribed in verse by Mrs. Alice Connerat Drew as follows:

The President's Sam

We's awful sad to our house, cause joy come to friends of our'n,
De railroad sen' for Big Man, so we sen' 'em Mr. Down'.
Dey jes can't mek dem trains fur run, lessen our president he go dere;
So uses has to lose him, to keep him us don't dare.
Him com here seberal years ago an mek dis Central fine,
An now him gone to Illinois to mek dat Central shine.
Dey takin long a fren' ob mine to ride 'em in dey car,
I tell you wot, Sam's stock was down, but now hit ris to par.
All dese niggers tryin' to be so intimate wid Sam
Dat ebery time dey sees him, dey tries fur shake he hand.
Dey say he'll mek big money, an maybe so he will,
But dat ain't nuthin' to dat boy, hit ain't de dollar bill.
He gwine jes cause he lobe 'em, dey been so good an kine
Dat Sam feel obligation, he got Miss' Downs to mine.
She ain't so awful strong you know, an dem Yankee servants slick,
Dey don' no much about her and dey liable fur mek her sick.
So Sam he jes gwine wid em to drive her 'round de town,
So dat our president can watch dem trains,
An mek dis worl' go round.

SOMETHING OUGHT TO BE DONE ABOUT THIS

Permission of Chicago Tribune

NEWS *of the* WEEK

Union Pacific—Photo by A. C. Smith

JOHN H. CRAWFORD of Wichita has been appointed a member of the Kansas Public Service Commission, succeeding Frank O'Brien, resigned. Previous to this appointment Mr. Crawford was in charge of the Kansas State Department of Labor.

THE RAILWAY CLUB OF PITTSBURGH will hold its next meeting on May 26 at the Fort Pitt Hotel, Pittsburgh, Pa., when a paper will be read on "Diesel Locomotives" by L. G. Coleman, manager, locomotive department, Ingersoll-Rand Company.

WALTER L. FISHER, of Chicago, formerly Secretary of the Interior, has been retained by the Interstate Commerce Commission as special counsel to represent it in the litigation over its order in the St. Louis & O'Fallon recapture case. Mr. Fisher also represented the commission as special counsel in the C. M. & St. P. investigation.

PLANS for relocating the New York Central's freight line which runs through the streets down the West Side of the Island of Manhattan, New York, have been laid before the city authorities by a committee of engineers representing the Port of New York Authority, the railroad, the Transit Commission, the Board of Transportation, the Board of Estimate and the Borough of Manhattan. The plan calls for placing the line, elevated or in a subway, on a private right-of-way and building warehouses and industrial buildings over it. The cost would run into the hundreds of millions and this phase of the problem is not considered in the report.

I. C. C. Announcements

The Interstate Commerce Commission has denied a petition filed by the Bingham & Garfield, the Ray & Gila Valley and the Nevada Northern for a re-opening of the proceedings involving the ascertainment of whether these roads suffered a deficit for the federal control period for which they should be reimbursed under Section 204 of the Transportation Act.

The Pennsylvania has been authorized by the Interstate Commerce Commission to use certain locomotives coming from divisions not equipped with automatic train control devices, on lines that will be thus equipped within specified terminal areas at Pittsburgh, Pa., Richmond, Ind., and Indianapolis, Ind.

The Interstate Commerce Commission has announced a postponement of the hearing assigned for May 17 on depreciation charges in the accounts of sleeping car companies.

Western Railway Club

The Western Railway Club held its annual dinner in Chicago on May 17. The principal speaker was Dr. Max Mason, president of the University of Chicago. W. G. Black, mechanical assistant to the president of the Erie, Cleveland Ohio, was elected president of the club for the ensuing year.

Other officers elected were: C. G. Juneau, master car builder of the Chicago, Milwaukee & St. Paul, first vice-president; A. W. Towsley, assistant to the vice-president of the Chicago, Rock Island & Pacific, second vice-president; J. W. Fogg, vice-president of Maclean-Fogg Lock-Nut Company, Chicago, treasurer; W. J. Dickinson, Railway Publications Service, Chicago, assistant secretary.

Directors chosen were: F. W. Rosser, retiring president; J. H. Nash, (Illinois Central); K. F. Burgess, (C. B. & Q.); E. B. Hall, (C. & N. W.); J. T. St. Clair, (A. T. & S. F.); F. H. Hammill, former vice-president of the C. & N. W., and W. F. Thiehoff (C. B. & Q.).

Strike Vote on C. P. R.

Clerks, freight handlers and station employees of the Canadian Pacific Railway in Toronto took a strike vote last week, as has been taken elsewhere on the system and as a result of the failure to reach an agreement on wages.

Grant Hall, vice-president of the C. P. R., in his final communication to the employees, said the company offered to increase rates of pay on the basis of three cents per hour for clerks and checkers and two cents per hour for truckers, or on a basis of 2½ cents per hour for all.

Representatives of the employees agreed to accept three cents an hour for clerks, checkers and truckers.

Speaking of truckers in his communication to the employees, Mr. Hall said this class of employee had received in recent years increases in their rates of pay which were extreme in comparison with, and at a ratio much in excess of, the increases accorded to other classes of employees, and the latter were greatly in excess of the increase in the cost of living.

The matters in dispute affect about 4,100 employees of the company.

C. & A. Apprentices' School

The Chicago & Alton opened a school for apprentices at its shops at Bloomington, Ill., on May 11. The 62 apprentices who have registered for the course have been divided into classes of 14 pupils each, to receive two hours of instruction one day each week. The students are given a fundamental training in mathematics, letter writing and drawing. Other compulsory subjects are mensuration, lathe work, steam locomotion, geometrical drawing and hydrostatics. Each day apprentices from each department make up the class of 14. On the first day there were four machinist apprentices, four boilermaker apprentices, one painter apprentice, one air-brake worker, one electrical worker, one coach shop apprentice and one wood worker. Upon the completion of the course diplomas will be awarded.

Reasonableness of Railroad Wages in 1920

In the New York Supreme Court (New York City) the New York Central has won a suit against the Western Union Telegraph Company, recovering a claim based on disagreement between the road and the Western Union concerning expenses under a contract which regulated joint operation of the telegraph lines along the right of way of the railroad. Under the contract the railroad company paid out for wages and maintenance on the lines, $438,899, which sum included wages paid at the increased rates fixed by the director general of railroads while the road was in the hands of the government; and the wage-rates thus established were continued after the government ceased

operation. The telegraph company refused to pay its share of the higher rates on the ground that it had never consented to the increases; but the court held that the increased wages were fair and reasonable, and directed a judgment for the sum claimed, $99,170, with the addition of interest amounting to $38,000.

Protective Section at San Francisco

The protective section of the American Railway Association, as heretofore announced, will hold its annual meeting at Hotel St. Francis, San Francisco, Cal., on Tuesday, Wednesday and Thursday, June 21, 22 and 23.

The opening session will be addressed by the mayor of San Francisco; by C. R. Graham, general manager of the American Railway Express Company at San Francisco, and by D. J. O'Brien, chief of police of the city.

The program lists the principal speakers at the business meetings as follows:

Tuesday afternoon. H. C. Booth (Southern Pacific); T. T. Keliher (I. C.); W. M. Skenyon (H. V.); F. F. Phillips (A. T. & S. F.).

Wednesday forenoon. G. S. Ward (Wabash); W. M. Jeffers, general manager of the Union Pacific; Mathew Brady, district attorney, San Francisco.

Wednesday afternoon. H. L. Denton (B. & O.); W. E. Carpenter, superintendent of claims, American Railway Express; T. E. Pratt (C. B. & Q.).

Thursday afternoon. I. D. Roosa (N. Y. C.); J. A. Dundon (S. P. & S.).

Pere Marquette Employees Threaten Strike

Employees belonging to eight brotherhoods on the Pere Marquette have voted to authorize their leaders to strike if the company does not agree to arbitrate certain questions of working conditions, according to press dispatches from Detroit on May 18. It is said that about 6,000 employees belong to the classes which have voted in favor of a strike. The brotherhoods named are the enginemen, conductors, firemen, brakemen, telegraphers, longshoremen, clerks and switchmen. It is said that the clerks also asked for an increase in pay. John Williams and William S. Blackman, representing the Federal Board of Mediation, are in Detroit, and are said to have been

(*Continued on page* 1542)

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 184 Steam Railways, Including 14 Switching and Terminal Companies

FOR THE MONTH OF MARCH, 1927 AND 1926

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Average number of miles operated	238,263.11	237,598.36	59,466.69	59,511.60	5,555.51	5,554.39	39,479.51	39,143.57	133,761.40	133,388.80
Revenues:										
Freight	$406,399,229	$401,952,572	$183,037,815	$183,985,772	$21,757,457	$19,912,367	$57,359,228	$61,371,467	$144,244,729	$136,682,966
Passenger	*a* 76,630,468	*b* 80,813,364	37,240,174	38,550,729	1,707,747	1,827,393	11,642,250	13,722,290	26,040,297	26,712,952
Mail	8,114,589	8,094,484	3,112,317	3,102,938	233,667	203,430	1,193,637	1,226,699	3,574,968	3,561,417
Express	12,409,834	13,237,169	6,171,338	6,425,503	304,116	304,108	1,642,562	2,011,881	4,291,818	4,495,677
All other transportat'n	17,168,830	16,821,388	9,677,885	9,667,971	209,041	183,618	956,380	1,068,989	6,325,524	5,900,810
Incidental	9,665,964	9,876,964	4,861,080	4,949,457	464,130	407,862	1,306,904	1,543,111	3,033,850	2,976,534
Joint facility—Cr.	1,067,465	1,026,605	429,276	412,613	14,254	10,555	148,543	138,756	475,392	464,681
Joint facility—Dr.	400,001	358,430	129,577	123,497	1,657	1,961	33,291	33,535	235,476	199,437
Ry. operat'g revenues	531,056,378	531,464,116	244,400,308	246,971,486	24,688,755	22,847,372	74,216,213	81,049,658	187,751,102	180,595,600
Expenses:										
Maintenance of way and structures	68,548,110	66,806,288	28,498,951	27,424,949	3,143,357	3,030,164	9,970,402	10,575,539	26,935,400	25,775,636
Mainten'ce of equipm't	109,232,712	113,090,763	52,245,022	55,071,437	5,177,892	5,214,247	14,294,371	14,938,038	37,515,427	37,867,041
Traffic	9,814,506	9,177,206	3,559,838	3,384,183	265,701	252,613	1,767,423	1,687,259	4,221,544	3,853,151
Transportation	188,144,149	188,880,663	90,005,702	90,951,952	6,402,955	6,195,440	25,928,633	27,596,521	65,806,859	64,136,750
Miscellaneous operat'ns	4,569,190	4,520,190	2,078,491	2,044,868	89,688	95,959	657,785	692,996	1,743,226	1,686,367
General	16,278,779	15,750,588	7,327,166	7,301,984	570,078	484,288	2,139,296	2,010,295	6,242,239	5,954,021
Transportation for investment—Cr.	1,164,148	1,093,335	241,789	100,585	12,586	13,991	187,702	220,962	722,071	757,797
Ry. operat'g expenses	395,423,298	397,132,363	183,473,381	186,078,788	15,637,085	15,258,720	54,570,208	57,279,686	141,742,624	138,515,169
Net revenue from railway operations	135,633,080	134,331,753	60,926,927	60,892,698	9,051,670	7,588,652	19,646,005	23,769,972	46,008,478	42,080,431
Railway tax accruals	31,079,006	31,194,036	12,537,141	12,738,425	1,805,138	1,529,426	4,330,771	4,510,121	12,405,956	12,416,064
Uncollectible ry. rev's	131,174	161,239	47,384	85,566	4,021	3,185	21,433	18,116	58,336	54,372
Ry. operating income	104,422,900	102,976,478	48,342,402	48,068,707	7,242,511	6,056,041	15,293,801	19,241,735	33,544,186	29,609,995
Equipm't rents—Dr. bal.	7,342,164	6,415,180	3,936,142	3,574,941	*d* 505,490	*d* 698,736	967,462	1,652,603	2,944,050	1,886,372
Joint facility rent—Dr. balance	2,132,502	1,903,710	1,054,195	866,582	124,401	91,478	91,898	104,296	862,008	841,354
Net railway operating income	94,948,234	94,657,588	43,352,065	43,627,184	7,623,600	6,663,299	14,234,441	17,484,836	29,738,128	26,882,269
Ratio of expenses to revenues (per cent)	74.46	74.72	75.07	75.34	63.34	66.78	73.53	70.67	75.49	76.70

FOR THREE MONTHS ENDED WITH MARCH, 1927 AND 1926

Average number of miles operated	238,172.63	237,514.45	59,464.48	59,495.11	5,555.51	5,551.17	39,457.57	39,143.57	133,695.07	133,324.60
Revenues:										
Freight	1,118,326,999	1,090,949,876	500,570,803	483,496,332	61,590,329	57,025,512	158,301,146	168,109,231	397,864,721	382,318,801
Passenger	*c* 236,775,552	*e* 249,016,255	116,340,998	118,120,373	5,202,925	5,494,807	36,540,188	44,159,175	78,691,441	81,241,900
Mail	23,442,227	23,700,166	8,832,060	8,870,255	620,326	629,956	3,507,570	3,605,331	10,482,271	10,594,624
Express	30,098,989	32,184,945	14,600,767	15,112,668	715,145	730,966	3,954,315	4,990,414	10,828,762	11,350,897
All other transportat'n	47,819,640	47,257,027	26,793,411	26,792,171	572,690	548,539	2,674,883	2,982,705	17,778,656	16,933,612
Incidental	28,713,634	29,111,234	14,706,836	14,512,068	1,206,030	1,121,575	3,803,964	4,600,607	8,996,804	8,876,984
Joint facility—Cr.	3,404,962	3,175,222	1,390,247	1,288,708	39,327	42,213	440,791	418,007	1,534,597	1,426,294
Joint facility—Dr.	1,263,536	1,141,920	400,359	394,428	6,516	5,921	94,017	101,564	762,644	640,007
Ry. operat'g revenues	1,487,318,467	1,474,252,805	682,834,763	667,798,147	69,940,256	65,587,647	209,128,840	228,763,906	525,414,608	512,103,105
Expenses:										
Maintenance of way and structures	187,113,248	184,673,981	79,314,630	78,724,855	9,196,377	8,588,447	29,020,288	30,185,165	69,581,953	67,175,514
Mainten'ce of equipm't	314,452,170	319,612,892	151,602,689	153,590,058	15,154,769	14,773,469	40,910,261	42,333,999	106,784,451	108,915,366
Traffic	29,292,418	27,108,715	10,706,771	9,886,904	759,544	727,449	5,361,234	5,152,275	12,464,869	11,342,087
Transportation	555,164,508	549,813,063	267,125,818	261,325,652	18,969,360	18,676,803	75,076,373	80,606,563	193,992,957	189,204,045
Miscellaneous operat'ns	13,651,931	13,414,288	6,386,599	6,210,115	268,106	289,350	1,893,371	2,048,508	5,103,855	4,866,315
General	47,901,248	45,745,129	21,951,440	21,100,689	1,634,102	1,392,674	6,252,757	5,941,823	18,062,949	17,309,943
Transportation for investment—Cr.	2,989,937	2,946,879	592,318	333,348	64,866	59,188	542,434	651,682	1,790,319	1,902,661
Ry. operat'g expenses	1,144,585,586	1,137,421,189	536,495,629	530,504,925	45,917,392	44,389,004	157,971,850	165,616,651	404,200,715	396,910,609
Net revenue from railway operations	342,732,881	336,831,616	146,339,134	137,293,222	24,022,864	21,198,643	51,156,990	63,147,255	121,213,893	115,192,496
Railway tax accruals	89,114,766	88,169,682	34,454,746	34,234,235	5,358,014	4,573,938	12,365,919	13,179,112	36,936,087	36,182,397
Uncollectible ry. rev's	350,517	398,582	134,404	208,307	8,089	11,340	53,891	40,459	154,133	138,476
Ry. operating income	253,267,598	248,263,352	111,749,984	102,850,680	18,656,761	16,613,365	38,737,180	49,927,684	84,123,673	78,871,623
Equipm't rents—Dr. bal.	20,704,567	18,497,669	11,534,306	9,614,250	*d* 1,368,838	*d* 1,909,508	2,623,274	5,417,250	7,915,825	5,375,677
Joint facility rent—Dr. balance	5,961,486	5,820,238	2,828,681	2,412,190	319,913	312,414	268,769	311,821	2,544,123	2,783,813
Net railway operating income	226,601,545	223,945,445	97,386,997	90,824,240	19,705,686	18,210,459	35,845,137	44,198,613	73,663,725	70,712,133
Ratio of expenses to revenues (per cent)	76.96	77.15	78.57	79.44	65.65	67.68	75.54	72.40	76.93	77.51

a Includes $3,319,594 sleeping and parlor car surcharge. *b* Includes $3,481,158 sleeping and parlor car surcharge. *c* Includes $9,650,298 sleeping and parlor car surcharge. *d* Deficit or other reverse item. *e* Includes $9,936,323 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Freight Operating Statistics of Large Steam Roads—Selected Items for March, 1927,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Average number of locomotives on line daily: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany	1927	407	226,674	242,252	25,699	5,153	67.0	263,092	96,695	112	15	11.6	9
	1926	407	266,647	292,711	35,957	5,529	67.5	290,118	113,624	129	17	11.3	3
Boston & Maine	1927	2,085	506,409	575,460	50,143	12,693	69.6	652,326	250,273	291	73	19.9	27
	1926	2,250	555,113	648,154	61,451	14,362	70.1	735,492	296,034	337	88	20.6	34
N. Y., New H. & Hartf.	1927	1,884	515,838	544,076	35,462	14,581	69.2	735,664	288,256	278	56	16.7	18
	1926	1,892	526,590	554,005	40,435	14,938	69.3	774,169	316,240	282	54	16.1	18
Great Lakes Region:													
Delaware & Hudson	1927	875	360,924	492,194	54,956	10,433	62.7	661,788	319,090	254	29	10.2	86
	1926	875	431,212	594,826	61,447	12,083	65.3	763,391	382,437	242	39	14.0	45
Del., Lack. & Western	1927	999	564,951	643,827	77,108	18,085	67.7	994,685	410,598	268	56	17.2	29
	1926	993	603,879	721,690	98,260	18,941	70.9	1,045,593	468,178	277	61	18.1	11
Erie (inc. Chic. & Erie)	1927	2,317	1,044,258	1,163,674	116,968	38,048	63.8	2,313,176	1,003,615	516	135	20.8	71
	1926	2,323	1,050,249	1,159,647	114,483	37,557	65.8	2,282,513	1,026,256	578	112	16.2	92
Lehigh Valley	1927	1,346	588,344	641,249	75,994	18,028	64.2	1,046,152	446,850	366	79	17.8	68
	1926	1,345	641,533	710,176	79,620	19,752	65.5	1,148,144	512,544	402	90	18.3	85
Michigan Central	1927	1,820	589,433	611,223	20,458	21,488	62.9	1,130,577	394,039	242	71	22.6	64
	1926	1,835	636,732	657,039	24,666	22,422	64.4	1,178,895	412,744	276	52	15.9	82
New York Central	1927	6,478	2,226,261	2,556,461	169,833	84,834	61.0	5,342,382	2,338,781	1,119	326	22.6	232
	1926	6,482	2,317,478	2,626,989	182,829	82,155	62.5	4,969,683	2,144,397	1,123	343	23.4	138
New York, Chic. & St. L.	1927	1,665	675,104	681,360	7,943	21,799	65.1	1,197,275	463,354	230	54	19.0	50
	1926	1,665	685,120	694,924	7,141	21,753	67.6	1,169,520	465,374	243	61	20.0	53
Pere Marquette	1927	2,180	465,587	475,889	8,078	12,196	61.1	725,025	298,563	189	35	15.5	22
	1926	2,179	452,499	463,964	6,117	11,693	64.8	660,294	274,253	186	30	13.8	22
Pitts. & Lake Erie	1927	231	140,307	142,659	2,579	5,189	59.8	413,636	232,586	50	19	27.1	5
	1926	231	140,340	144,381	1,711	4,610	60.8	351,578	192,793	63	16	20.6	15
Wabash	1927	2,497	830,283	865,853	13,412	25,342	63.4	1,444,890	539,435	327	49	13.1	47
	1926	2,497	750,590	781,201	12,246	23,315	67.6	1,262,875	493,788	301	66	18.0	54
Central Eastern Region:													
Baltimore & Ohio	1927	5,220	2,083,682	2,457,566	210,644	61,977	61.5	4,172,367	2,026,943	1,017	214	17.4	59
	1926	5,197	1,965,033	2,292,851	169,685	55,836	62.7	3,551,242	1,671,730	983	204	17.2	142
Central of New Jersey	1927	691	268,023	292,857	33,434	7,901	59.2	524,400	250,873	186	40	17.6	14
	1926	691	305,199	334,314	41,058	7,807	58.2	525,739	251,464	240	30	11.1	46
Chicago & Eastern Ill.	1927	945	326,043	333,084	4,898	8,451	62.3	542,416	258,486	110	46	29.6	11
	1926	945	280,436	283,897	4,053	7,518	63.7	458,910	214,842	120	38	24.0	31
Clev., Cin., Chic. St. L.	1927	2,374	833,895	875,468	28,464	26,520	61.9	1,758,214	837,000	341	91	21.0	14
	1926	2,374	763,547	796,550	20,956	23,309	60.5	1,512,042	686,451	328	106	24.5	13
Elgin, Joliet & Eastern	1927	461	159,549	168,655	7,693	4,586	61.3	361,491	189,634	80	11	12.2	...
	1926	460	146,206	155,933	8,240	4,293	62.9	325,364	166,537	80	12	12.9	...
Long Island	1927	393	48,530	53,027	14,974	660	55.3	43,147	16,307	43	8	15.3	...
	1926	393	55,214	62,068	15,931	715	57.8	45,561	18,202	46	9	16.5	...
Pennsylvania System	1927	10,843	4,863,963	5,354,521	415,457	146,288	63.2	9,748,120	4,581,584	2,862	429	13.0	507
	1926	10,882	5,133,444	5,612,047	440,518	140,052	62.6	9,199,910	4,230,548	2,659	612	18.7	168
Reading	1927	1,130	689,107	749,208	76,295	18,333	58.1	1,322,178	663,717	319	73	18.6	19
	1926	1,131	713,857	782,251	72,847	18,451	60.5	1,273,356	645,461	362	76	17.3	45
Pocahontas Region:													
Chesapeake & Ohio	1927	2,651	1,250,342	1,354,985	52,320	41,676	56.2	3,359,321	1,815,384	551	90	14.0	34
	1926	2,637	1,190,917	1,280,553	44,320	35,438	55.0	2,859,589	1,520,110	547	92	14.4	50
Norfolk & Western	1927	2,232	887,878	1,073,267	35,848	30,649	59.7	2,560,720	1,399,722	545	58	9.7	124
	1926	2,231	894,814	1,103,730	38,376	29,445	59.7	2,378,059	1,265,892	569	59	9.4	129
Southern Region:													
Atlantic Coast Line	1927	5,011	852,986	859,285	13,979	22,552	59.9	1,275,268	473,534	416	56	11.9	53
	1926	4,924	1,053,673	1,068,323	18,506	25,966	59.6	1,510,540	581,138	415	49	10.5	19
Central of Georgia	1927	1,898	316,919	321,170	6,985	8,098	71.0	436,008	189,794	139	24	14.8	11
	1926	1,907	390,119	392,092	6,944	8,822	67.9	499,171	221,901	157	21	11.6	20
I. C. (inc. Y. & M. V.)	1927	6,555	2,075,781	2,082,353	48,691	57,377	62.7	3,730,972	1,631,271	802	93	10.4	23
	1926	6,555	1,916,729	1,932,938	42,386	52,452	65.0	3,223,787	1,395,214	764	120	13.6	15
Louisville & Nashville	1927	5,044	1,810,026	1,884,439	61,764	37,223	60.7	2,543,262	1,235,698	599	113	15.9	2
	1926	5,021	1,873,000	1,976,458	70,113	35,375	60.5	2,378,711	1,139,349	597	116	16.2	7
Seaboard Air Line	1927	4,237	648,153	661,672	11,362	16,335	63.4	947,918	376,802	263	50	15.8	...
	1926	3,905	692,923	706,198	15,930	17,011	64.5	969,077	395,220	276	28	9.2	...
Southern Railway System	1927	8,021	2,174,509	2,211,152	41,246	54,033	65.0	3,051,571	1,260,700	1,075	164	13.2	23
	1926	8,043	2,304,221	2,354,979	42,654	54,539	65.3	3,077,667	1,273,935	1,033	152	12.8	28
Northwestern Region:													
Chic. & North Western	1927	8,463	1,450,164	1,501,868	22,629	36,011	65.0	2,036,672	830,077	754	150	16.6	117
	1926	8,457	1,467,352	1,505,892	25,728	34,346	62.9	1,922,583	769,355	747	191	20.4	110
Chic., Milw. & St. P.	1927	11,198	1,606,844	1,707,003	98,911	47,514	65.4	2,713,038	1,161,853	791	193	19.6	161
	1926	11,202	1,520,394	1,645,376	100,027	44,422	66.7	2,454,979	1,048,839	886	214	19.5	214
Chic., St. P., Minn. & Om.	1927	1,724	305,469	323,894	14,176	6,413	68.9	340,290	140,712	153	36	18.8	2
	1926	1,819	317,688	340,804	13,586	6,165	67.5	326,903	132,461	164	37	18.5	4
Great Northern	1927	8,164	732,515	758,316	44,079	25,225	68.3	1,402,686	624,630	555	163	22.7	144
	1926	8,222	732,635	760,955	43,426	25,102	69.2	1,366,750	609,022	584	152	20.6	157
M., St. P. & S. Ste. M.	1927	4,368	512,459	524,417	4,626	12,895	68.3	682,689	298,441	295	33	10.2	33
	1926	4,372	529,897	542,165	3,935	12,508	69.4	639,169	276,427	290	50	14.7	25
Northern Pacific	1927	6,498	759,739	805,048	45,745	25,486	71.5	1,365,156	604,179	485	154	24.1	109
	1926	6,510	802,047	845,649	46,000	26,734	70.8	1,436,596	637,006	512	136	21.0	105
Oreg.-Wash. R. R. & Nav.	1927	2,164	187,388	198,633	16,045	5,692	72.8	315,533	141,649	137	22	13.6	15
	1926	2,185	181,957	191,464	14,880	5,668	76.9	296,360	132,740	138	19	12.2	14
Central Western Region:													
Atch., Top. & S. Fe (incl. P. & S. F.)	1927	10,377	1,686,613	1,815,179	98,219	53,627	66.5	3,117,237	1,209,174	750	167	18.2	132
	1926	10,143	1,495,056	1,590,436	78,841	45,843	65.3	2,643,204	990,253	804	156	16.3	255
Chicago & Alton	1927	1,022	324,279	350,072	5,339	7,681	58.3	503,477	218,309	142	18	11.5	29
	1926	1,022	307,783	326,147	5,307	7,214	60.2	447,021	187,412	138	21	13.4	29
Chic., Burl. & Quincy	1927	9,336	1,624,977	1,683,101	59,250	49,993	61.7	3,050,503	1,398,460	722	254	26.0	37
	1926	9,349	1,522,854	1,566,795	53,330	45,521	63.9	2,621,826	1,169,643	808	196	19.5	67
Chic., Rock I. & Pacific	1927	7,562	1,480,321	1,528,038	17,352	36,741	60.7	2,140,141	792,615	556	121	17.9	43
	1926	7,564	1,380,552	1,427,569	15,127	33,198	62.6	1,869,848	689,607	534	158	22.9	48
Denver & R. G. Wn.	1927	2,536	214,406	254,059	45,035	6,235	70.3	362,508	172,406	220	47	17.6	51
	1926	2,548	208,762	249,068	43,850	5,931	68.5	337,486	153,269	225	48	17.6	47
Oregon Short Line	1927	2,537	269,692	291,991	29,181	8,273	72.7	471,471	211,693	184	24	11.4	53
	1926	2,537	325,795	340,379	20,576	8,941	71.0	504,140	218,718	197	23	10.5	65
Sou. Pac.—Pac. Lines	1927	8,723	1,487,381	1,619,162	220,872	46,334	64.2	2,810,925	1,073,087	684	250	26.7	85
	1926	8,556	1,484,250	1,625,285	249,030	44,987	63.8	2,701,017	1,018,014	729	207	22.1	80
Union Pacific	1927	3,714	800,296	827,556	41,757	32,616	76.3	1,658,949	681,033	469	45	8.7	207
	1926	3,691	910,377	935,997	42,032	35,535	74.5	1,822,322	735,981	475	64	11.9	191
Southwestern Region:													
Gulf, Colo. & S. Fe	1927	1,933	430,384	456,330	11,635	12,225	58.5	811,731	353,840	143	31	18.0	3
	1926	1,897	273,111	281,234	4,911	8,089	61.3	505,213	216,691	120	18	13.0	26
Mo.-Kans.-Tex.	1927	1,787	273,533	274,096	5,566	9,931	61.5	575,652	217,975	103	22	17.9	34
	1926	1,787	247,125	248,025	5,513	8,590	61.6	492,302	188,006	113	17	12.9	44
Mo.-Kans.-Tex. of Tex.	1927	1,389	190,771	196,089	4,164	5,450	60.6	323,693	126,834	116	16	12.2	55
	1926	1,389	172,934	176,791	2,898	4,591	61.7	264,776	102,428	124	21	14.4	61
Missouri Pacific	1927	7,317	1,360,186	1,395,870	48,325	40,319	64.5	2,374,229	1,002,895	539	81	13.1	5
	1926	7,310	1,389,031	1,421,986	42,710	39,658	64.4	2,292,293	949,079	530	90	14.5	3
St. Louis-San Francisco	1927	4,860	787,669	802,638	9,892	19,503	63.7	1,141,106	472,652	424	62	12.7	90
	1926	4,895	822,504	843,119	15,927	19,304	62.8	1,119,892	459,870	423	77	15.4	65
Texas & New Orleans	1927	4,550	733,607	735,839	2,073	16,365	66.2	946,355	388,851	255	59	18.8	34
	1926	4,435	660,352	661,266	1,981	14,873	67.3	821,240	337,715	253	74	22.6	34
Texas & Pacific	1927	1,954	394,857	394,917	1,128	10,703	61.4	644,329	236,987	137	32	16.9	18
	1926	1,953	304,198	304,215	1,415	8,318	64.4	473,087	174,168	156	27	14.9	11

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Compared with March, 1926, for Roads with Annual Operating Revenues Above $25,000,000.

Region, road and year	Average number of freight cars on line daily: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotive and tender	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
New England Region:													
Boston & Albany....1927	2,814	5,418	8,232	2.7	15,703	1,161	427	18.8	379	30.1	7,663	190	68.0
1926	2,026	6,080	8,106	3.5	13,608	1,088	426	20.6	452	32.6	9,007	193	72.7
Boston & Maine....1927	13,300	11,986	25,286	6.1	14,776	1,288	494	19.7	319	23.3	3,872	134	55.5
1926	11,983	17,894	29,877	7.6	13,686	1,325	533	20.6	320	22.1	4,243	157	53.9
N. Y., New H. & Hartf..1927	20,249	17,893	38,142	17.0	17,627	1,426	559	19.8	244	17.8	4,936	126	56.1
1926	15,979	23,765	39,744	13.9	16,275	1,470	601	21.2	257	17.5	5,392	139	57.2
Great Lakes Region:													
Delaware & Hudson....1927	10,693	6,531	17,224	3.4	21,528	1,834	884	30.6	598	31.2	11,761	157	62.4
1926	8,690	7,737	16,427	5.2	19,935	1,770	887	31.7	751	36.3	14,096	175	75.4
Del., Lack. & Western...1927	17,416	7,678	25,094	3.7	22,016	1,761	727	22.7	528	34.4	13,255	145	71.9
1926	14,857	9,140	23,997	4.6	20,339	1,731	775	24.7	629	35.9	15,216	182	78.2
Erie (inc. Chic. & Erie)..1927	34,437	22,189	56,626	7.8	25,328	2,215	961	26.4	572	34.0	13,971	132	63.5
1926	34,233	21,563	55,796	7.9	24,624	2,173	977	27.3	593	33.0	14,252	138	59.7
Lehigh Valley 1927	23,520	9,071	32,591	8.7	24,913	1,778	760	24.8	442	27.8	10,712	156	52.0
1926	19,986	12,473	32,459	7.4	22,861	1,790	799	25.9	509	29.9	12,289	165	51.8
Michigan Central 1927	16,926	18,156	35,082	3.7	28,531	1,918	668	18.3	362	31.4	6,985	125	65.2
1926	15,484	21,032	36,516	4.3	26,234	1,851	648	18.4	365	30.8	7,256	126	67.0
New York Central....1927	70,483	70,856	141,339	3.4	29,114	2,400	1,051	27.6	534	31.7	11,646	114	60.9
1926	62,612	74,172	136,784	4.1	25,173	2,144	925	26.1	506	31.0	10,671	134	61.8
New York, Chic. & St. L..1927	13,431	10,316	23,747	5.4	24,145	1,773	686	21.3	629	45.5	8,977	114	78.3
1926	12,921	10,299	23,220	5.4	22,567	1,707	679	21.4	647	44.7	9,017	125	74.5
Pere Marquette 1927	10,556	9,033	19,589	3.7	19,098	1,557	641	24.5	492	32.9	4,418	112	69.9
1926	9,218	10,239	19,457	4.6	16,786	1,459	606	23.5	455	29.9	4,060	121	70.2
Pitts. & Lake Erie....1927	13,720	8,817	22,537	4.7	30,806	2,948	1,658	44.8	333	12.4	32,415	107	67.8
1926	12,612	8,287	20,899	5.8	26,423	2,505	1,374	41.8	298	11.7	26,869	82	59.1
Wabash 1927	14,494	12,889	27,383	2.5	26,312	1,740	650	21.3	635	47.1	6,969	133	75.4
1926	13,427	11,991	25,418	2.5	24,040	1,683	658	21.2	627	43.8	6,379	149	69.7
Central Eastern Region:													
Baltimore & Ohio....1927	69,751	33,178	102,929	4.3	20,840	2,002	973	32.7	635	31.6	12,527	162	69.9
1926	65,050	36,362	101,412	5.4	18,816	1,807	851	29.9	532	28.3	10,376	180	66.9
Central of New Jersey...1927	18,858	11,906	30,764	5.1	18,631	1,957	936	31.8	263	14.0	11,713	163	46.7
1926	15,371	15,127	30,498	3.5	16,023	1,723	824	32.2	266	14.2	11,741	176	44.8
Chicago & Eastern Ill....1927	12,938	5,039	17,977	23.3	22,051	1,664	793	30.6	464	24.3	8,822	145	69.9
1926	13,808	4,621	18,429	18.1	21,783	1,636	766	28.6	376	20.7	7,333	155	58.9
Clev., Cin., Chic. St. L..1927	17,761	21,038	38,799	5.0	26,757	2,108	1,004	31.6	696	35.6	11,374	122	67.6
1926	18,161	20,149	38,310	4.5	23,901	1,980	899	29.5	578	32.4	9,327	137	60.7
Elgin, Joliet & Eastern...1927	8,996	8,180	17,176	4.3	14,584	2,266	1,189	41.3	356	14.1	13,282	138	62.5
1926	9,884	8,057	17,941	5.3	14,508	2,225	1,139	38.8	299	12.3	11,684	148	57.6
Long Island 1927	1,758	5,329	7,087	1.3	4,792	889	336	24.7	74	5.4	1,338	337	43.7
1926	1,933	8,320	10,253	0.8	4,632	825	330	25.5	57	3.9	1,493	321	46.0
Pennsylvania System....1927	214,393	78,260	292,653	4.7	22,127	2,004	942	31.3	505	25.5	13,631	132	56.6
1926	208,686	96,774	305,460	9.3	18,927	1,792	824	30.2	447	23.6	12,540	149	59.7
Reading 1927	27,352	15,254	42,606	2.8	21,294	1,919	963	36.2	503	23.9	18,949	153	67.9
1926	20,872	19,788	40,660	3.4	19,169	1,784	904	35.0	512	24.2	18,415	179	62.9
Pocahontas Region:													
Chesapeake & Ohio....1927	29,375	11,663	41,038	3.2	30,410	2,687	1,452	43.6	1,427	58.3	22,091	101	70.8
1926	29,384	11,140	40,524	3.9	25,743	2,401	1,276	42.9	1,210	51.3	18,594	117	66.9
Norfolk & Western....1927	28,775	8,243	37,018	1.4	37,946	2,884	1,576	45.7	1,220	44.7	20,233	142	59.3
1926	28,901	9,797	38,698	2.0	34,018	2,658	1,415	43.0	1,055	41.1	18,301	161	58.7
Southern Region:													
Atlantic Coast Line....1927	23,401	13,097	36,498	3.2	19,034	1,495	555	21.0	419	33.3	3,048	118	59.6
1926	22,184	25,072	47,256	2.9	16,204	1,434	552	22.4	397	29.8	3,807	130	75.5
Central of Georgia....1927	5,253	6,753	12,006	3.1	18,814	1,376	599	23.4	510	30.6	3,226	140	64.9
1926	5,029	9,255	14,284	3.1	16,053	1,280	569	25.2	501	29.3	3,754	159	72.3
I. C. (inc. Y. & M. V.)..1927	42,432	25,166	67,598	5.2	23,274	1,797	786	28.4	778	43.7	8,028	134	76.8
1926	41,746	23,587	65,333	4.2	21,483	1,682	728	26.6	689	39.9	6,866	144	72.1
Louisville & Nashville....1927	44,918	18,122	63,040	8.6	16,212	1,405	683	33.2	632	31.4	7,903	163	88.1
1926	43,448	20,008	63,456	6.8	14,059	1,270	608	32.2	579	29.7	7,319	184	92.6
Seaboard Air Line....1927	15,689	11,437	27,126	3.9	16,778	1,462	581	23.1	448	30.6	2,869	142	69.4
1926	12,081	18,853	30,934	1.5	14,641	1,399	570	23.2	412	27.5	3,265	156	76.8
Southern Railway System.1927	57,136	27,498	84,634	5.8	18,799	1,403	580	23.3	481	31.7	5,070	156	58.7
1926	52,537	32,636	85,173	4.9	16,652	1,336	553	23.4	482	31.6	5,109	173	65.2
Northwestern Region:													
Chic. & North Western...1927	49,768	27,978	77,746	6.3	17,524	1,404	572	23.0	344	23.0	3,164	143	54.4
1926	47,910	26,980	74,890	7.0	15,849	1,310	524	22.4	331	23.5	2,934	158	52.7
Chic., Milw. & St. P....1927	53,839	21,663	75,502	5.2	21,260	1,688	723	24.5	496	31.1	3,347	143	59.2
1926	54,370	20,064	74,434	6.0	19,610	1,615	690	23.6	455	28.8	3,020	155	51.2
Chic., St. P., Minn. & Om.1927	3,168	8,274	11,442	11.9	13,567	1,114	461	21.9	397	26.2	2,634	137	57.9
1926	3,066	8,150	11,216	12.0	12,439	1,029	417	21.5	381	26.3	2,349	171	56.7
Great Northern 1927	41,198	9,378	50,576	6.4	22,048	1,915	853	24.8	398	23.5	2,468	147	36.1
1926	42,009	8,843	50,852	8.9	21,099	1,866	831	24.3	386	23.0	2,390	149	35.3
M., St. P. & S. Ste. M...1927	19,458	5,728	25,186	3.5	15,361	1,332	582	23.1	382	24.2	2,204	118	52.0
1926	18,179	5,883	24,062	4.6	13,245	1,206	522	22.1	371	24.2	2,040	133	51.8
Northern Pacific 1927	37,283	7,368	44,651	7.3	22,823	1,797	795	23.7	436	25.8	2,999	147	42.9
1926	34,288	6,907	41,195	7.4	22,552	1,791	794	23.8	499	29.6	3,156	154	44.4
Oreg.-Wash. R. R. & Nav.1927	7,323	3,719	11,042	4.5	20,272	1,684	756	24.9	414	22.8	2,111	184	43.8
1926	7,326	3,096	10,422	5.0	19,789	1,629	730	23.4	411	22.8	1,959	185	42.5
Central Western Region:													
Atch., Top. & S. Fe 1927	57,293	18,248	75,541	6.2	26,097	1,848	717	22.5	516	34.4	3,759	121	67.3
(incl. P. & S. F.)....1926	56,323	14,982	71,305	7.0	24,694	1,768	662	21.6	448	31.8	3,149	126	56.1
Chicago & Alton....1927	10,101	5,582	15,683	3.4	19,231	1,553	673	28.4	449	27.1	6,891	149	71.6
1926	9,916	4,367	14,283	6.3	17,656	1,452	609	26.0	423	27.1	5,916	172	66.9
Chic., Burl. & Quincy....1927	49,244	18,725	67,969	3.9	24,469	1,877	861	28.0	664	38.5	4,832	137	57.6
1926	50,674	16,622	67,296	6.1	21,945	1,722	768	25.7	561	34.1	4,036	152	52.1
Chic., Rock I. & Pacific..1927	32,780	21,622	54,402	7.4	18,111	1,446	535	21.6	470	35.9	3,381	153	73.7
1926	33,755	18,597	52,352	10.5	18,585	1,354	500	20.8	425	32.7	2,941	162	67.3
Denver & R. G. Wn....1927	11,644	3,200	14,844	2.3	17,376	1,691	804	27.7	375	19.3	2,193	194	36.1
1926	11,524	2,893	14,417	3.2	17,078	1,617	734	25.8	343	19.4	1,940	200	34.6
Oregon Short Line....1927	7,822	6,120	13,942	3.6	23,866	1,748	785	25.6	490	26.3	2,692	129	50.0
1926	7,995	3,881	11,876	6.0	21,801	1,547	671	24.5	594	34.2	2,781	136	52.8
Sou. Pac.—Pac. Lines....1927	34,438	25,945	60,383	5.3	23,440	1,890	721	23.2	573	38.5	3,968	127	63.6
1926	32,383	26,185	58,568	6.6	21,829	1,820	686	22.6	561	38.8	3,838	130	64.6
Union Pacific 1927	22,109	8,647	30,756	13.4	33,545	2,073	853	20.9	716	44.8	5,932	114	54.6
1926	18,315	8,711	27,026	12.2	32,384	2,002	808	20.7	878	56.9	6,432	122	58.6
Southwestern Region:													
Gulf, Colo. & S. Fe....1927	9,970	7,729	17,699	3.0	24,448	1,886	822	28.9	645	38.1	5,905	113	86.9
1926	10,941	3,958	14,899	2.8	25,677	1,850	793	26.8	469	28.6	3,685	110	67.0
Mo.-Kans.-Tex. 1927	8,714	4,108	12,822	4.9	28,929	2,105	797	21.9	548	40.6	3,934	104	71.9
1926	9,243	3,697	12,940	4.3	27,532	1,992	761	21.9	469	34.7	3,393	104	62.9
Mo.-Kans.-Tex. of Tex...1927	254	9,330	9,584	9.0	22,109	1,697	665	23.3	427	30.3	2,945	113	49.0
1926	327	9,508	9,835	9.6	20,383	1,531	592	22.3	336	24.4	2,378	110	40.1
Missouri Pacific 1927	27,241	19,081	46,322	4.7	22,528	1,746	737	24.9	698	43.5	4,421	128	75.2
1926	28,163	20,965	49,128	6.9	20,873	1,650	683	23.9	623	40.5	4,188	137	76.2
St. Louis-San Francisco..1927	20,973	10,330	31,303	3.7	18,677	1,449	600	24.2	487	31.6	3,137	162	53.9
1926	20,180	11,134	31,314	5.1	17,537	1,362	559	23.8	474	31.7	3,030	164	55.5
Texas & New Orleans....1927	11,837	15,058	26,895	5.4	18,028	1,290	530	23.8	466	29.6	2,757	109	75.8
1926	11,529	14,126	25,655	9.0	17,356	1,244	511	22.7	425	27.8	2,456	119	65.4
Texas & Pacific....1927	6,371	6,872	13,243	6.9	21,720	1,632	600	22.1	577	42.4	3,912	113	67.7
1926	6,836	5,796	12,632	3.5	19,991	1,555	573	20.9	445	33.0	2,876	115	53.9

News of the Week

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trying for some weeks to settle the differences on the Pere Marquette. An increase of 7½ per cent was granted to conductors and brakemen last month.

President Frank H. Alfred is quoted as denying the statement the company has refused to arbitrate; he expressed a willingness and desire to act according to the Federal law but objected to a method of arbitration which was suggested by the representatives of the labor unions.

According to a report as this issue was going to press the Federal Board of Mediation has succeeded in bringing about an agreement in this controversy, certain details of the dispute being definitely settled and agreement reached for submission of other points of issue to arbitration.

Exports of Railroad Ties

Exports of railroad ties from the United States in 1926 were valued at $3,507,629 for 3,760,613 ties, including softwood and hardwoods, treated and untreated, according to the Lumber Division, Department of Commerce. This is above the average for the past five years. From 1920 on to 1924, inclusive, values averaged one dollar a tie. For the past two years the average value has decreased.

The average domestic consumption of ties being around 120 million a year and the export since 1913 averaged 3,600,000 per year, the percentage of production exported is about 3 per cent. In the export trade hardwood ties play a minor part. Douglas fir and Southern pine ties treated and untreated, are exported in about equal quantities.

Hardwood ties are exported mainly to Canada and to Mexico. The largest export to Canada crosses the Michigan border, much smaller quantities finding outlet at Duluth and Superior and other points. Exports to Mexico of hardwood ties are principally through the San Antonio and New Orleans customs. Half to two-thirds of treated softwood ties go out of New Orleans, Oregon and Washington exporting most of the remainder. In untreated ties California, with redwood, leads, Washington and New Orleans following. Treated softwood ties go to the West Indies and Central America.

Fuel Association Convention Exhibit

Seventy-three companies exhibited railway equipment and supplies having a bearing on fuel economy at the International Railway Fuel Association Convention held at the Hotel Sherman May 10-13. The annual meeting of the International Railway Supplymen's Association, under the auspices of which this exhibit was held, was held on May 13, and elected the following officers for 1927-1928: President, F. P. Roesch, Standard Stoker Company, Chicago; vice-president, W. H. Harris, W. H. Harris Coal Company, Chicago; secretary, M. K. Tate, Lima Locomotive Works, Lima, Ohio; treasurer, L. R. Pyle, Locomotive Firebox Company, Chicago, and assistant secretary-treasurer, W. J. Dickinson, Railway Publications Service, Chicago. The following is a list of the companies' products on exhibition and representatives in attendance.

American Arch Company, New York.—Locomotive brick arches. Represented by W. L. Allison, J. T. Anthony, J. D. Brandon, A. W. Clokey, E. H. Cook, H. Darby, T. F. Ferguson, R. J. Himmelright, W. W. Neal, J. P. Neff, C. T. Pfeiffer and A. M. Sucese.

American Locomotive Company, New York.—Three-cylinder locomotive model, power reverse gear, steampipe casing and grease cellar, four-wheel engine truck, wrist pin, hand rail column and articulated staybolt. Represented by Robert Brown, Arthur Haller, G. G. Jones, S. H. Michaels, W. S. Morris, N. C. Naylor and A. F. Pitkin.

American Railway Appliances Company, Inc., New York.—Locomotive flue blower. Represented by J. W. Henry and F. C. Porter.

American Strombos Company, Philadelphia.—Air locomotive whistles. Represented by Clark Cooper and Clark Cooper, Jr.

American Throttle Company, Inc., New York.—Multiple throttle valve. Represented by E. A. Averill, Bard Browne, W. A. Buckbee, E. J. Drewyour, Geo. Fogg, W. Grove, N. T. McKee, J. F. Mourne, R. M. Ostermann, R. R. Porterfield, G. E. Ryder, F. A. Schaff, K. E. Stillwell and R. J. Van Meter.

Argyle Railway Supply Company, Chicago.—Pyropad stone. Represented by A. H. Green and W. P. Whitfield.

Ashcroft Manufacturing Company, New York.—Locomotive gages, locomotive cut-off control gage and prismatic water gage. Represented by C. L. Brown, J. H. Bush, C. H. Butterfield, H. D. Carlton, C. W. Corning, P. H. Ryan, J. Soule Smith, J. P. Walsh and W. H. Williston.

Badeker Manufacturing Company, Chicago.—Piston rod packing and hub liner. Represented by E. V. Lea and J. P. McKinley.

Baldwin Locomotive Works, The, Philadelphia, Pa.—Photographs of locomotives and literature. Represented by W. H. Evans, C. H. Gaskill, F. A. Neely and Chas. Riddell.

Barber Greene Company, Aurora, Ill.—Motion picture of coal handling equipment, portable and permanent conveyors. Represented by J. H. Gregory, H. M. Stillings and L. G. Thomas.

Barco Manufacturing Company, Chicago.—Power reverse gears, lubricated balanced plug valves, flexible ball joints and smokebox blower fittings. Represented by F. N. Bard, W. J. Behlke, C. O. Jenista, A. S. Lewis and C. L. Mellor.

Bethlehem Steel Company, Bethlehem, Pa.—Literature on Bethlehem auxiliary locomotive. Represented by I. C. Jordan and F. M. Morley.

Bird-Archer Company, New York.—Blow-off cocks, anti-pitting, anti-scaling and anti-foaming compounds. Represented by J. L. Callahan, J. J. Clifford, C. J. McGurne, R. A. Wilsey and L. F. Wilson.

Boss Bolt & Nut Works, Chicago.—Represented by W. G. Willcoxson.

Bradford Corporation, The, New York.—Front end throttle valve. Represented by E. J. Barnett, A. C. Bodeau, J. C. Keene, W. A. McWhorter and A. F. Stuebing.

Buda Company, Harvey, Ill.—Safety self-lowering jacks, ball bearing journal jacks, turbo generator set for train control and locomotive lighting. Represented by H. P. Bayley, R. M. Blackburn, F. L. Gormley and D. C. Peterson.

Coal Publishing Corporation, Evanston, Ill.—Represented by A. McKinstry and C. W. Edwards.

Coffin, Jr., Company, The J. S., Jersey City, N. J.—Feed water heater system. Represented by W. T. Comley, H. J. Hague, R. P. Peckett, Jr., and E. L. Schellens.

Consolidated Safety Valve Company, New York.—Locomotive safety valves. Represented by C. L. Brown, J. H. Bush, C. H. Butterfield, H. D. Carlton, C. W. Corning, P. H. Ryan, J. Soule Smith, J. P. Walsh and W. H. Williston.

Dearborn Chemical Company, Chicago.—Water treatment for boilers. Represented by F. J. Boatright, I. Bowen, L. P. Bowen, L. D. Brown, George R. Carr, J. A. Crenner, Nelson F. Dunn, E. M. Hoffman, F. B. Horstmann, W. H. Kinney, R. Q. Milnes, C. S. Murray, John Nutting and Harry Ross.

Detroit Lubricator Company, Detroit, Mich.—Locomotive force feed oilers, thermostatic heater, Bullseye locomotive lubricators, automatic flange oilers, pendulum type; transfer filler and improved standard lubricator. Represented by C. L. Butler, A. G. Machesney and S. A. Witt.

Dickinson, Inc., Paul, Chicago.—Model of portable locomotive drafter; smoke jacks for cars and cabooses, and cast iron steam exhaust heads. Represented by A. E. Engman and J. W. Linsley.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Lifting jacks. Represented by E. E. Thulin and E. N. Thulin.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Mechanical lubricators, injectors, hydrostatic lubricators, coal sprinklers, oil burners, boiler checks, line checks, water columns, fire extinguishers, guide oil cups, water glasses, reflex type; water gage cocks and boiler gage cocks. Represented by William Beck, E. O. Corey, H. A. Glenn and F. S. Wilcoxen.

Franklin Railway Supply Company, Inc., New York.—Literature on automatic fire doors, locomotive boosters, power reverse gears, radial buffer, adjustable wedge, etc. Represented by C. W. F. Coffin, F. H. Cunningham, W. T. Lane, J. L. Randolph, S. D. Rosenfelt, Paul Weiler, T. P. Whelan and Paul Willis.

Garlock Packing Company, The, Palmyra N. Y.—Railroad packings. Represented by S. H. Flannagan and H. G. Ramshaw.

Garratt-Callahan Company, San Francisco, Cal.—Boiler preservative. Represented by A. H. Baker, J. G. Barclay, H. M. Gray and A. H. Hawkinson.

Gilg, Henry F., Pittsburgh, Pa.—Piston valve. Represented by Henry F. Gilg.

Graham-White Sander Corporation, Roanoke, Va.—Locomotive sanders. Represented by W. L. Ranson and W. H. White.

Hancock Inspirator Company, The, New York.—Hancock inspirators, boiler checks, water columns and fittings; globe, angle, gate and main steam valves; cone seat and disc valves, locomotive chime whistles, hose strainers, gage cocks, coal sprinklers, boiler testers, pneumatic cylinder cocks. Represented by C. L. Brown, J. H. Bush, C. H. Butterfield, H. D. Carlton, C. W. Corning, P. H. Ryan, J. Soule Smith, J. P. Walsh and W. H. Williston.

Hulson Grate Company, Keokuk, Iowa.—Locomotive grates. Represented by A. W. Hulson, J. W. Hulson, P. J. Kaveney and O. L. Yocum.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Gun iron cylinder bushings, valve bushings, cylinder packing rings, valve rings, piston and bull rings, crosshead shoes, floating rod bushings, and sectional packing ring. Represented by V. W. Ellet, E. J. Fuller, C. L. Galloway, F. B. Hartman and J. G. Platt.

Huron Manufacturing Company, Detroit, Mich.—Washout plugs and arch tube plugs. Represented by Midgley & Borrowdale, H. N. Reynolds, E. C. Roddie, Jr., E. H. Willard and M. T. Willard.

Johns-Manville Corporation, New York.—High temperature cement; moulded insulation for air pump head; flexible locomotive cab pipe insulation; front end gasketing tape; pipe and boiler insulation; packings and gaskets. Represented by P. R. Austin, P. C. Jacobs, F. C. Vandervoort, Jr., L. S. Wilbur and J. C. Younglove.

Lima Locomotive Works, Inc., Lima, Ohio.—Pictures of new super-power two-cylinder steam locomotive. Represented by M. K. Tate.

Locomotive Finished Material Company, The, Atchison, Kan.—Combination universal packing ring and bull ring, universal sectional packing and universal blow-off muffler. Represented by C. Hastings, R. L. McIntosh and E. V. Lea.

Locomotive Firebox Company, Chicago.—Thermic syphons. Represented by John Baker, T. F. Klein, L. R. Pyle, C. M. Rogers, C. A. Seley, A. A. Taylor and A. M. Wheeler.

Locomotive Stoker Company, Pittsburgh, Pa.—Locomotive stokers and locomotive coal pusher. Represented by T. Baldwin, J. B. Ball, J. J. Byrne, H. C. Cale, O. B. Capps, R. Clare, W. G. Clark, H. W. Cook, N. D. Cook, V. B. Emerick, E. R. Funk, H. C. Huston, R. G. Kelley, E. F. Milbank, J. M. Jordan, E. Prouty, E. Ryan, K. M. Stoller, A. N. Willsie, A. L. Wipple and H. C. Woodbridge.

Locomotive Tire Truing Corporation, Tulsa, Okla.—Literature explaining use of locomotive driving wheel truing and flange reducing device. Represented by T. J. Talevich.

MacLean-Fogg Lock Nut Company, Chicago.—Lock nuts. Represented by J. W. Fogg and J. A. MacLean.

Manning, Maxwell & Moore, Inc., New York.—Pressure gages, safety valves, inspirators and other boiler fittings. Represented by C. L. Brown, J. H. Bush, C. W. Corning, P. H. Ryan, J. Soule Smith and J. P. Walsh.

Metal & Thermit Corp., New York.—Literature on welding. Represented by C. D. Young.

Miner, Inc., W. H., Chicago.—Draft gear. Represented by B. S. Johnson and R. H. Weber.

Mudge & Company, Chicago.—Spark arrester for locomotives. Represented by F. H. DeBrun and A. R. Fletcher.

Nathan Manufacturing Company, New York.—Injectors, lifting and non-lifting; water columns, low water alarm, hydrostatic and mechanical lubricators and boiler checks. Represented by W. Barr, Frederick C. Davern, F. Ehredt, L. Kassander, J. A. Kelly, F. E. Marsh, T. J. Murphy, W. R. Walsh and Richard Welsh.

National Railway Devices Company, Chicago.—Radial fire doors. Represented by E. J. Gunnison and J. G. Robinson.

National Refining Company, Chicago.—Railway lubricants. Represented by Gus Johnson, O. Leath, Harry Oakes, Grover Rohow and E. Simms.

Norton, Inc., A. O., Chicago.—Lifting jacks. Represented by R. J. McKay.

Ohio Injector Company, Chicago.—Lubricators, automatic flange oiler, injectors, fire jet, low water alarm, automatic graduating drifting valve, boiler fittings, combination boiler ceck and stop valve, hose strainer, injector starting valve. Rep-

resented by N. M. Barker, A. C. Beckwith, F. B. Farnsworth, W. H. Malone and C. G. Sauerberg.

Okadee Company, The, Chicago.—Blow-off valve, front end hinge, tender hose coupler, water glass protector, etc. Represented by W. H. Heckman, A. G. Hollingshead and C. W. Prohm.

Pilliod Company, The, New York.—Valve gear model. Represented by W. H. Bellmaine, J. H. Cooper, F. Fisher, J. Purdy and R. H. Weather y.

Pilot Packing Company, Inc., Chicago.—Packing, decarbonizer, drifting valve, sheet packing. Represented by W. W. Bacon, Jos. Sinkler and R. N. Sinkler.

Pyle-National Company, The, Chicago.—Turbo generators for locomotive lighting, train control, train lighting and industrial purposes; headlights, classification, marker and back-up lamps; floodlights for all purposes; safety-first switches, plugs and receptacles, and heavy conduit fittings for railroad use; a complete line of fittings for train control and locomotive wiring. Represented by I. V. Baker, W. T. Bretherton, G. E. Haas, J. Will Johnson, Fred Kersten, W. A. Ross and Walter Smith.

Q & C Company, The, New York.—Heat enduring metal for grate bars, center bar carriers, stoker parts, superheater parts and arch supports. Represented by R. J. McComb, G. Shenton, J. L. Terry and L. Thomas.

Railway Purchases & Stores, Chicago.—Magazines. Represented by K. F. Sheeran and Edward Wray.

Roberts & Schaefer Company, Chicago.—Literature regarding patent ash reclaiming plant, automatic electric locomotive coaling plant, locomotive cinder plant, engine coaler and cinder plant and coal tipple. Represented by B. B. Shaw.

Sargent Company, Chicago.—Water column, water glass protector, blower valve, gage cocks, and water glass gaskets. Represented by L. L. Schultz.

Sellers & Co., Inc., Wm., Philadelphia, Pa.—Exhaust feed water heater injector, boiler checks and valves. Represented by P. E. Raymond.

Simmons-Boardman Publishing Company, New York.—Copies of *Railway Age* and Railway Mechanical Engineer. Represented by R. F. Duysters, H. A. Morrison, J. M. Rutherford, H. C. Wilcox and E. L. Woodward.

S K F Industries, New York.—Journal bearings and boxes. Represented by H. E. Brunner, R. W. Taylor, M. S. McNay and T. E. Rounds, Jr.

Standard Stoker Company, Inc., New York.—Working model of stoker; bulletins and other descriptive matter. Represented by R. L. Belknap, H. N. Carmer, W. P. Chenault, C. T. Hansen, H. S. Mann, F. C. Pickard, F. P. Roesch, E. T. Schroeder, William Sperflage.

Steam Coal Buyer, St. Louis, Mo.—Copies of publication. Represented by J. A. Harris.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Headlights and turbo generators. Represented by T. F. Kelly, Clarence Kinnow and J. H. Schroeder.

Superheater Company, The, New York.—Literature describing superheater, exhaust steam injector and feed water heater. Represented by E. A. Averill, Bard Browne, W. A. Buckbee, E. J. Drewyour, George Fogg, W. Grove, J. E. Mourne, R. M. Ostermann, R. R. Porterfield, G. E. Ryder, F. A. Schaff, K. E. Stilwell and R. J. Van Meter.

Talmage Manufacturing Company, The, Cleveland, Ohio.—Low water alarm. Represented by F. M. Reby.

Transportation, Los Angeles.—Magazine. Represented by F. A. Walsh.

Transportation Devices Corporation, Indianapolis, Ind.—Mechanical cut-off control, cut-off indicator. Represented by F. H. Lutz and E. S. Pearce.

Union Asbestos & Rubber Company, Chicago.—Insulating tapes and various insulating materials. Represented by G. H. Hull, J. H. Kuhns and G. J. Martin.

Union Draft Gear Company, Chicago.—Model friction draft gear. Represented by J. A. King, F. E. Schmitz and J. E. Tarelton.

Union Metal Products Company, Chicago.—Represented by A. A. Frank.

Universal Packing & Service Company, Chicago.—Spring journal box packing. Represented by W. H. Davis and G. P. Landreth.

Viloco Railway Equipment Company, Chicago.—Locomotive sander, whistle operator, vacuum bell ringer, automatic rail washer, metalic packing and grease lubricator. Represented by W. H. Heckman, A. G. Hollingshead and C. W. Ploen.

Wayne Tank & Pump Company, Fort Wayne, Ind.—Water softener. Represented by R. H. Langston and E. L. Marchant.

Worthington Pump & Machinery Corporation, New York.—Locomotive feedwater heater. Represented by L. Brooks, William Christiansen, W. G. Clark, D. R. Coleman, J. P. Collins, J. F. Cosgrove, E. C. Jackson, J. M. Lammedee, T. E. McGowan, G. R. Mulqueeney, F. F. Murray, T. C. McBride, R. H. Ramey, G. P. Schumaker and J. A. Wilson.

Wyoming Shovel Works, Wyoming, Pa.—Locomotive scoops. Represented by M. S. Hendrickson and Stanley H. Smith.

Traffic

The National Railways of Mexico, in conjunction with the Missouri Pacific, the International-Great Northern, the St. Louis Southwestern, the Southern Pacific and the Texas Mexican, has established through package-car freight service between points in the United States and points in Mexico. Through bills of lading will be issued under these arrangements.

Obedience to Shippers' Routing Instructions

Acting upon the frequent complaint of shippers in various parts of Canada the Dominion Railway Board at Ottawa last week issued a circular indicating it is to take steps to see that the railways obey the instructions as to routing contained in bills of lading.

"Railway companies under the jurisdiction of the Board are directed," says the circular, "to show, cause why a general order should not issue requiring all such railway companies to observe and perform the directions given on bills of lading by shippers as to the routing of traffic when routing is opened under the tariffs in force.

"All railway companies are required to file within twenty days their respective submissions showing cause against such an order, after filing of which the matter will be set down for hearing at a convenient date."

Derby Day Traffic Is Large

A total of 32 special and regular trains carrying over 5,000 people attending the Kentucky derby on May 14 were operated by the Pennsylvania, the Chicago, Indianapolis & Louisville, the Cleveland, Cincinnati, Chicago & St. Louis and the Chicago & Eastern Illinois from Chicago to Louisville, Ky., on May 12 and 13. The Pennsylvania moved a total of 15 trains of 8 to 12 cars, of which nine special and two regular trains left on Thursday and three special and one regular train left on Friday. Of the special trains eight were chartered by the members of clubs in Chicago. In addition to these trains, this company ran one special from New York, one from Pittsburgh, Pa., and one from Detroit, Mich.

The Monon operated a total of 13 eleven-car trains; six extra and two regular on Thursday, and three extra and two regular on Friday. Among these were five trains chartered by members of clubs in Chicago and the Cuban train of the Pullman Company which the Edgewater Beach hotel hired for its guests. Another of the specials was made up of private cars.

The Big Four ran three specials. The two 12-car trains which left Chicago on Thursday accommodated special parties. The Chicago & Eastern Illinois, in conjunction with the Southern, operated one special of eight cars from Chicago on Thursday.

Grain Rate Investigation Resumed

The investigation of the rate structure of grain and grain products, I. C. C. Docket 17,000, Part 7, was resumed at Dallas, Texas, on May 9 before Commissioner Meyer and Examiner Mackley. Grain shippers in the western district have a distinct advantage in rates over shippers of other commodities, according to the testimony introduced by the carriers. J. C. Gutsch, assistant to the freight traffic manager of the Chicago, Rock Island & Pacific, showed that earnings on grain and grain products on his road have been relatively less than on other commodities. He said that this company lost $21,814,980 or an average yearly loss of $4,362,996 in freight revenue on grain and grain products in the five-year period from 1922 to 1926. An exhibit which he introduced showed that a sharp decrease had taken place in freight rates from Oklahoma and other shipping points to Texas, while rates to other markets had increased.

Education in Packing and Loading

Over 1,600 employees of railroads, shippers and express companies have attended instructional courses in loss and damage prevention started last December by the Committee on Freight Claim Prevention of the American Railway Association with the co-operation of the inspection bureaus, freight container bureau and others, under the auspices of the regional claim conference, to disseminate the fundamentals of good practice in crating, boxing, and loading. The meetings follow the completion of the course on boxing and crating held at the Forest Products Laboratory, Madison, Wis., in October.

The first meeting was that held by the Eastern Claim Conference in December at New York, and which was attended by 163 railroad and express company employees. The Northwestern Claim Conference held its meeting at St. Paul, Minn., on March 3, with an attendance of 478. The Southwestern Claim Conference held its meeting at Fort Worth, Texas, on May 3 with an attendance of 160 representatives. At St. Louis, Mo., the Central Claim Conference held a meeting on May 5 for 295 railroad and express employees and on May 6 for 191 shippers. Two meetings were also held by the Southeastern Claim Conference at Atlanta, Ga., one on May 9 for 160 shippers and one on May 10 for 160 railroad and express men.

The Jacksonville & Havana, operating a line from Havana, Ill., southward to Jacksonville, 42 miles, has entered into a 50-year contract with the Chicago, Burlington & Quincy for use of the latter's line from Jacksonville, Ill., southeastward, 18 miles, to Waverly. The leasing of this 18-mile section provides a connection between the Jacksonville & Havana and the Chicago, Springfield & St. Louis which two roads are controlled by the same interests,

making a through line from Havana southward to Alton, Ill., 125 miles.

Freight Traffic in March

Freight traffic for March amounted to 41,816,180,000 net ton-miles which exceeded by 2,218,535,000 net ton-miles, or 5.6 per cent, the best previous record for any March, which was established in 1923, according to compilations made by the Bureau of Railway Economics. It also exceeded by 3,147,280,000 net ton miles or 8.1 per cent that for March, 1926.

In the Eastern district, an increase of 8.2 per cent was reported, while the Southern District reported an increase of 1.6 per cent. The Western district showed an increase of 11.1 per cent.

Freight traffic for the first three months this year amounted to 118,293,890,000 net ton-miles, the greatest ever reported for that period in the history of the railroads. This was an increase of 6,544,591,000 net ton miles, or 5.9 per cent, over the record established during the corresponding period in 1926. It also was an increase of 12,366,501,000 net ton miles, or 11.7 per cent, over the corresponding period in 1925.

Railroads in the Eastern district reported an increase of 6.8 per cent in the first quarter, but the Southern district reported a decrease of nine-tenths of one per cent. In the Western district, an increase of 7.5 per cent was reported.

The average daily movement per car in March, according to the Bureau, was 30.9 miles per day, the highest average for that month ever attained since the compilation of these reports started in 1917. This was an increase of 1.7 miles above that for March last year and an increase of 4.5 miles above the average for March, 1925.

The average load per car in March was 27.4 tons, an increase of one ton compared with the average for March, 1826, and an increase of 1.3 tons compared with March, 1925. It also was an increase of eight-tenths of one ton above that for March, 1924, but was a decrease compared with 1920, 1922 and 1923.

On the B. & A. at Riverside, Mass.

Equipment and Supplies

Locomotives

Erie Places Orders for Eighty Locomotives

The Erie has ordered 30 eight-wheel switching locomotives from the Baldwin Locomotive Works, 25, 2-8-4 type locomotives from the American Locomotive Company and 25, 2-8-4 type from the Lima Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of April 30.

THE PEORIA & PEKIN UNION is inquiring for three eight-wheel switching locomotives.

THE GULF, MOBILE & NORTHERN has ordered four Decapod type locomotives from the Baldwin Locomotive Works.

THE DULUTH, MISSABE & NORTHERN has ordered four 10-wheel switching locomotives from the Baldwin Locomotive Works. Inquiry for 6 locomotives was reported in the *Railway Age* of February 19.

Freight Cars

PEORIA & EASTERN.—See New York Central.

THE CHICAGO & ILLINOIS MIDLAND has ordered four caboose cars from the American Car & Foundry Company.

THE CAMBRIA & INDIANA has given a contract for repairs to 300 hopper cars to the Pressed Steel Car Company.

THE TIMKEN ROLLER BEARING COMPANY has ordered 3 gondola cars of 70 tons' capacity from the Canton Car Company and 3 from the American Car & Foundry Company.

THE LEHIGH & NEW ENGLAND has given a contract for repairs to 200 hopper cars to the American Car & Foundry Company. An inquiry for prices on this work was reported in the *Railway Age* of April 30.

THE NEW YORK CENTRAL has ordered 50 box cars of 55 tons' capacity from the American Car & Foundry Company, for service on the Peoria & Eastern. This is in addition to orders for 3,500 cars reported in the *Railway Age* of May 14.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 300 steel underframe box cars of 55 tons' capacity from the American Car & Foundry Company and 200 steel underframe box cars of 55 tons' capacity from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of April 9.

Machinery and Tools

THE CHICAGO, BURLINGTON & QUINCY is inquiring for one structural punch.

THE UNION PACIFIC is inquiring for one boring mill and two upsetting machines.

THE NORTHERN PACIFIC is inquiring for one precision lathe and two 4-ft. radial drills.

THE MISSOURI PACIFIC has ordered a 90-in. Putnam driving wheel lathe from Manning, Maxwell & Moore, Inc.

THE TEXAS & PACIFIC has ordered a 100-ton bushing press and a 20-in. by 48-in. center lathe from the Niles-Bement-Pond Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has ordered a 10-ton electric overhead crane from the Harnischfeger Sales Corporation and another from the Whiting Corporation.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for one turret lathe, one 24-in. lathe, one 36-in. planer, two 20-ton locomotive cranes and one 160-ton wrecking crane. An order for a 48-in. car wheel borer has been given to the Niles-Bement-Pond Company.

Iron and Steel

THE PENNSYLVANIA is inquiring for 200 tons of steel.

THE SOUTHERN has ordered 250 tons of steel for a bridge from the American Bridge Company.

THE BALDWIN LOCOMOTIVE WORKS has ordered 8,500 tons of steel for an addition at its Eddystone, Pa., works, from the American Bridge Company.

THE ILLINOIS CENTRAL has ordered 1,600 tons of structural steel for viaducts at Van Buren, Congress and Harrison streets, Chicago, from the American Bridge Company.

Signaling

THE WABASH has ordered from the Union Switch & Signal Company, 20 color light signals, style R, together with relays, switch boxes and other apparatus for the installation of an automatic block signal system between Adrian, Mich., and Britton.

THE SOUTHERN PACIFIC has ordered from the Union Switch & Signal Company material for the installation of automatic block signals on 210 miles of its lines in Texas, all single track; 271 semaphores, style B, one-arm; 85 style B, two-arm; 700 relays, 300 switch boxes, etc. The signals are to be installed on the Galveston, Houston & San Antonio, from Marfa to Hot Wells, 80 miles; Houston & Texas Central, from Nelleva to Hearne, 45 miles; Texas & New Orleans, from Mexia to Dallas, 85 miles.

Supply Trade

Robert T. Kent has been appointed general manager of the **Bridgeport Brass Company,** Bridgeport, Conn.

Walter H. Bentley has been appointed special representative, with headquarters at Chicago, of the **Railway Curtain Company.**

The American Insulated Wire & Cable Company, Chicago, has changed its name to the **American Insulated Wire & Cable Corporation.**

The Dayton Manufacturing Company, Dayton, O., has opened a new office at 25 Church street, New York, in charge of **Joseph Leidenger,** vice-president.

The American Malleable Castings Association, 2013 Union Trust building, Cleveland, Ohio, has changed its name to the **Malleable Iron Research Institute.**

D. P. Hess, manager of the Columbus, Ohio, plant of the **Timken Roller Bearing Company,** has been appointed assistant to the president, with headquarters at Canton, Ohio, effective June 1.

C. F. Messinger, vice-president of the **Chain Belt Company,** Milwaukee, Wis., has been appointed vice-president of the **Stearns Conveyor Company,** Cleveland, Ohio, which company has recently been purchased by the Chain Belt Company.

E. R. Wyler, who has been connected with the Cleveland, O., sales branch of the **Independent Pneumatic Tool Company,** has been transferred to the sales department at the general offices in Chicago. Mr. Wyler will have his headquarters at St. Paul, Minn.

William H. Neville will represent the **Roller-Smith Company,** New York, in the state of Alabama. Mr. Neville will have his headquarters in the Age-Herald building, Birmingham, Ala. **The Atkinson Equipment Company,** Atlanta Trust building, Atlanta, Ga., will represent the Roller-Smith Company in the state of Georgia.

The Austin Company, Cleveland, O., has opened a branch office in the Dixie Terminal building, Cincinnati; **H. L. Cornelison,** until recently manager of the Miami office, is in charge of the new Cincinnati office. The territory covered by the Cincinnati office includes southern Ohio, southern Indiana and Kentucky. The Chicago office of the Austin Company was removed to larger quarters at 510 North Dearborn street on May 1.

The Western Electric Company has organized a new manufacturing branch at its Hawthorne works in Chicago to be known as the **Specialty Products Shop.** Among its many functions are the building of microphones, vitaphone parts, audiphones, telegraph and railroad signaling apparatus, test sets and telephone heating coil elements. **Jay W. Skinkle,** formerly signaling sales manager of the Graybar Electric Company, has been appointed superintendent of this new branch.

H. B. Chamberlain, assistant to president of the **Tuco Products Corporation,** New York, has been appointed vice-president. Mr. Chamberlain served in 1909 in the motive power department at Baltimore, Md., of the Baltimore &

H. B. Chamberlain

Ohio. The following year he went to the Safety Car Heating & Lighting Company in its electrical laboratory at Jersey City, N. J. At the time of the formation of the Transportation Utilities Company, which later became the Tuco Products Corporation, Mr. Chamberlain was identified with the manufacturing department at Chicago, later entering the sales department in New York and serving from 1916 to 1918 as sales manager. He was then appointed manager of the marine department of the Ellcon Company at New York, and since May, 1925, has been associated with the Tuco Products Corporation as assistant to president.

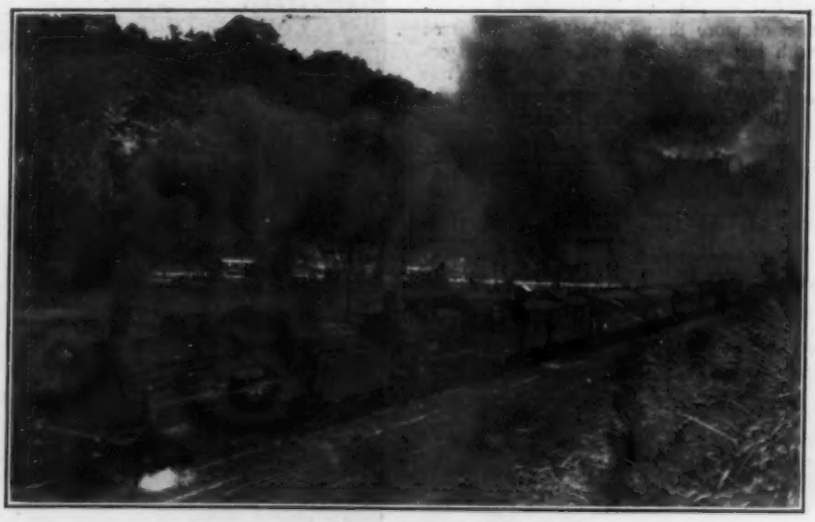
Manning, Maxwell & Moore, Inc.

Manning, Maxwell & Moore, Inc., are engaged in an extensive program of development covering new and special machinery of various kinds as well as new devices of other characters, notably an entirely new form of gearing to be used for automobile differentials and other purposes. It has acquired the entire line of heavy machine tools formerly manufactured by the Detrick & Harvey Machine Company of Baltimore, and also the Beaman & Smith line of milling machines and special production machines for automotive and other operations, which line was formerly manufactured at Providence, R. I. It has taken over these lines completely, including good-will, patterns, drawings, etc., and will develop and produce them at the plant of the Putnam Machine Company, Fitchburg, Mass.

The program necessitates devoting its entire selling efforts and general resources to its own lines, and, therefore, it is discontinuing the sale of machine tools for other manufacturers with exceptions noted below. The branch offices at Birmingham, Philadelphia, Buffalo, Boston and Cleveland will be closed, but expert direct representatives will be located in those territories to conduct sales and service of Putnam tools including the new lines and developments, and products of the Shaw Crane plant.

The Chicago office will be continued as a department of Manning, Maxwell & Moore, Inc., under the management of R. S. Dean, and in that territory a selected line of machine tools will be handled in addition to products of the Putnam and Shaw plants.

In the Pittsburgh territory Norman



A Dresden-Munich Express Train, near Dresden

Allderdice, formerly sales manager for Manning, Maxwell & Moore, Inc., has organized a machine selling company to be known as the Arch Machinery Company and arrangements have been made for that company to act as sales agents for products of the Putnam Machine Company and in certain areas products of the Shaw Crane Works.

Both manufacturing and sales operations of the Putnam and Shaw plants of Manning, Maxwell & Moore, Inc., will be under the executive direction of Frank J. Baumis, who is vice-president of Manning, Maxwell & Moore, Inc., and president of the Putnam Machine Company. Joseph Wainwright will be general sales manager of machinery sales, and W. B. Clark will be general sales manager of crane sales.

Manning, Maxwell & Moore, Inc., will continue to act as exclusive sales agents in the railroad trade for the Monarch Machine Tool Company and the Amplex Machinery Company.

The Ashcroft-Hancock-Consolidated, and other steam specialties manufacturing and sales activities of Manning, Maxwell & Moore, Inc., are in no way affected by these changes.

Westinghouse Electric & Manufacturing Company

Sales by the Westinghouse Electric & Manufacturing Company for the year ended March 31, 1927, totalled $185,500,000 and were the largest in its history, exceeding the previous record figure of last year by twenty million dollars. The net income available for dividends, $16,138,441, was exceeded only once before during the history of the company. The earnings per share of stock (preferred and common) were $6.80 or 13.8 per cent. Both classes of stock are now receiving $4.00 per share of $50 par value, according to the company's annual report.

The balance sheet shows cash of $13,477,607 against $12,606,180 a year previous. Current assets total $120,000,000, whereas the current liabilities amount only to $18,000,000. Of the current assets, $72,000,000 consists of inventories, a reduction of more than $7,000,000 as compared with last year. The value of unfilled orders at the close of the fiscal year was $55,300,000, a slight increase over last year.

The income statement follows:

	Year ended March 31	
	1927	1926
Gross earnings:		
Sales billed	$185,543,087	$166,066,800
Cost of sales	169,764,086	151,711,939
Net manufacturing profit	$15,779,001	$14,294,862
Other income	2,585,614	2,295,363
Gross income from all sources	$18,364,615	$16,590,225
Interest on bonds	2,226,174	2,468,224
Net income available for dividends and other purposes	$16,138,441	$14,122,001

Obituary

D. B. Hussey, vice-president and secretary of the Hussey, Hobbs Tie Company, St. Louis, Mo., died on May 13.

Construction

BALTIMORE & OHIO.—A contract for the construction of a 200-ton four-track reinforced concrete coaling station at Akron Junction, Ohio, has been let to the Ogle Construction Company, Chicago.

BOSTON & MAINE.—This road is planning to construct two sidings, 85-car capacity, for north and southbound traffic at Manchester, N. H. The work is to be done this coming summer.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been let to the Ogle Construction Company, Chicago, for the construction of a two-track electric cinder pit at Armourdale, Kan.

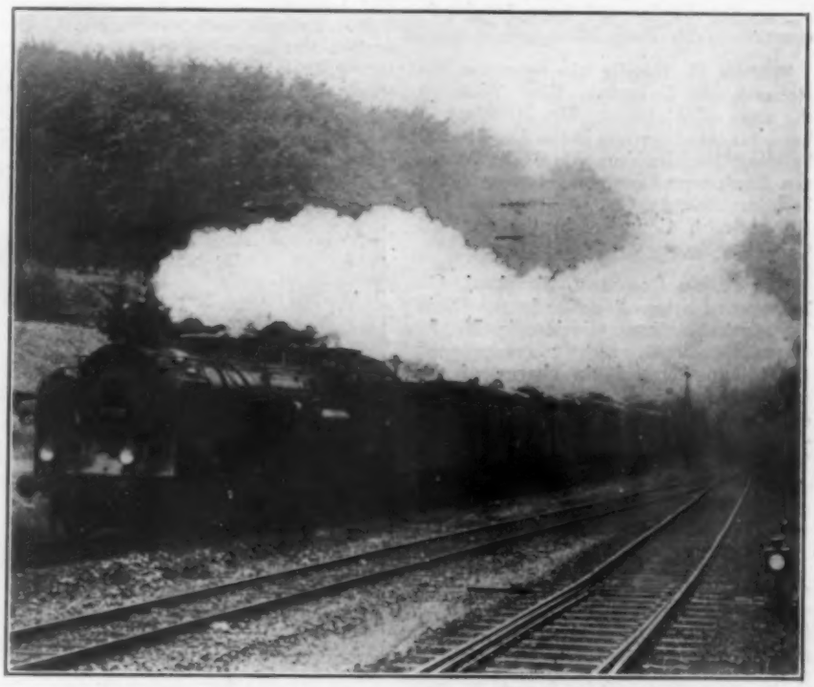
DELAWARE, LACKAWANNA & WESTERN.—This road has awarded a contract to James S. McCormack Co., of Easton, Pa., for grade elimination at E. Alexander, N. Y., which, it is estimated, will cost $75,000.

DENVER & RIO GRANDE WESTERN.—A contract for the grading and concrete construction in connection with the line revision on the Grand Junction division, between Minturn, Colo., and Eagle, 26 miles, has been let to the Morrison-Knudsen Company, Boise, Idaho, at an approximate cost of $423,500. Another contract has been awarded to the List Construction Company, Kansas City, Mo., for the grading and concrete construction in connection with the line revision between Brown Canon, Colo., and Beuna Vista, on the Salida division, 3 miles, at an estimated cost of $210,000. A water treating plant will be installed for this company at Pueblo, Colo., by the Stearns-Roger Manufacturing Company, Denver, Colo., at an estimated cost of $30,000. A contract has been let to E. W. Wright, Grand Junction, Colo., for grading in connection with the rearrangement of tracks at 13 points between Chacra, Colo., and Green River, Utah.

NEW ORLEANS GREAT NORTHERN.—This company will soon ask for bids for the construction of a six-stall brick round house, a yard office, an automobile shed and other terminal buildings at Jackson, Miss.

TEMISKAMING & NORTHERN ONTARIO.—A contract has been awarded to Angus & Taylor, North Bay, Ont., for constructing the extension of that road into the Rouyn region of Quebec. The contract calls for 27 miles of grading, ballasting and rail laying which will be commenced next week and is to be completed in November.

WESTERN PACIFIC.—A certificate has been issued authorizing the Western Pacific to construct a branch line extending from a connection with its main line at a point approximately 1 mile north of Kingdon in a westerly direction to and through the village of Terminous to a point on the east bank of Little Potato Slough, a distance of approximately 7.5 miles, all in San Joaquin County, Cal. Cost of construction of the branch is estimated at $435,974.



Cologne-Berlin (Germany) Express at Altenbeken Tunnel

Railway Finance

ATCHISON, TOPEKA & SANTA FE.—*Abandonment of Branch.*—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its Perris-Elsinore line from Perris, Cal., to Elsinore, 10.29 miles.

CHESAPEAKE CORPORATION.—*Organization of New Company.*—W. L. Ross, president of the New York, Chicago & St. Louis, has mailed to stockholders a letter describing the newly formed Chesapeake Corporation, which letter reads as follows:

"For the purpose of separating the common carrier activities of your company from its holdings of stock in the Chesapeake & Ohio Railway Company and Pere Marquette Railway Company your management during 1926 turned over all of such stock in exchange for all of the stock of a subsidiary, which now holds the following assets: 345,000 shares common stock of the Chesapeake & Ohio, 1,200 shares prior preference stock and 8,800 shares preferred stock of Pere Marquette, 174,900 shares common stock of Pere Marquette (under commitment for sale to the Chesapeake & Ohio, subject to approval of the Interstate Commerce Commission, at $110 a share as of January 1, 1927).

"Against all of these assets there is an indebtedness of approximately $34,000,000. At a meeting of your board of directors held May 9, 1927, subject as to certain details, to the approval of the executive commitee, which met May 10, 1927, it was voted to vest in a new company, the Chesapeake Corporation, 345,000 shares of common stock of the Chesapeake & Ohio, subject to an indebtedness equal to $67.50 a share thereon. The Chesapeake Corporation will issue one and a half shares of its common stock, without par value, for each share of the common stock of the Chesapeake & Ohio acquired by it.

"It was also voted to distribute shares of the Chesapeake Corporation directly to the common stockholders of your company at the rate of 1.7 shares of the Chesapeake Corporation for each share of the common stock of your company held by common stock holders of your company as of record at the close of business May 31, 1927.

"The Chesapeake Corporation is also to acquire 255,000 additional shares of the common stock of the Chesapeake & Ohio from the Vanness Company upon the same terms as those acquired from your subsidiary.

"The Chesapeake Corporation will provide for the discharge of the indebtedness of $67.50 a share on the 600,000 shares of the Chesapeake & Ohio thus held by it and also for working capital by the issue of $48,000,000 of twenty-year 5 per cent convertible collateral trust bonds sold to J. P. Morgan & Co. and the Guaranty Company of New York.

"The new shares to be distributed to you, together with the shares of your company which you will retain, will represent the same value of assets and the same earnings as the present shares of your company which you now hold. Application will be made promptly to list the shares of the Chesapeake Corporation on the New York Stock Exchange."

The Wall Street Journal has made an estimate that the shares of the new Chesapeake Corporation are worth $45.00 a share, thereby making the 1.7 shares to be distributed on each share of Nickel Plate common stock worth a market value of $76.50. Its analysis follows:

"With its initial structure the Chesapeake Corporation will have income of $4,800,000 annually while Chesapeake & Ohio common stocks pay $8 a share, of which $2,400,000 will be absorbed by interest charges on the $48,000,000 bonds. The surplus will be equal to $2.66 a share on the 900,000 shares of stock. The new corporation might pay $2.50 in dividends. If its stock in view of certain speculative possibilities, were to sell on a 5.50 per cent basis, or $45 a share, the 1.7 shares to be distributed on each share of Nickel Plate common would have a market value of $76.50. The 5 per cent collateral trust bonds of the Chesapeake Corporation were sold at a price to net nearly 5.50 per cent, but have since advanced more than two points.

"Statement of President Ross to Nickel Plate stockholders appears to indicate that Nickel Plate will get no cash for its C. & O. stock, other than that used to clear the indebtedness of $67.50 a share to which its C. & O. stock, is now subject. His statement says further that all of the 600,000 shares of the C. & O. to be acquired by the Chesapeake Corporation are subject to the same indebtedness, indicating that the Chesapeake Corporation will require $40,500,000 to clear such indebtedness. If it obtained 91 for its bonds, or $43,680,000 it would appear to have left $3,180,000 as the working capital referred to in President Van Sweringen's letter to the bankers.

"Nickel Plate will lose the income on the C. & O. stock. Last year it received 12 per cent on the 155,000 shares of C. & O. it then held equal to $6.10 a share on its own 303,456 shares of common stock. This loss would reduce its shares earnings from the $20.10 of 1926 to $14 a share. Deduction of $76 from the present price of Nickel Plate common, $207, would leave $131 as the price of a stock which earned $14 last year and might be expected to pay a $7 dividend on the new basis."

CHICAGO, ROCK ISLAND & PACIFIC.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line between Reasnor and Monroe, La., 17 miles.

FLORIDA EAST COAST.—1926 *Earnings.*—Annual report for 1926 shows net income after interest and other charges of $2,783,950 as compared with $3,840,670 in 1925. Selected items from the income statement follow:

Florida East Coast

	1926	1925
Average mileage operated	849.21	776.05
RAILWAY OPERATING REVENUES	$29,427,460	$29,132,738
Maintenance of way	$4,904,666	$4,238,004
Maintenance of equipment	4,323,940	3,958,282
Transportation	10,593,578	10,943,839
TOTAL OPERATING EXPENSES	$20,406,598	$19,927,851
Operating ratio	69.3	68.4
NET REVENUE FROM OPERATIONS	$9,020,861	$9,204,887
Railway tax accruals	1,569,935	1,508,579
Railway operating income	$7,436,748	$7,687,340
NET RAILWAY OPERATING INCOME	Not shown	
Non-operating income	$843,648	$715,955
GROSS INCOME	$8,280,396	$8,403,295
Hire of freight cars—Dr.	2,130,911	2,181,474
TOTAL DEDUCTIONS FROM GROSS INCOME	$2,493,522	$2,554,400
Income available for interest on funded debt	$5,786,875	$5,848,895
Interest on funded debt	$3,002,925	$2,008,525
Net income carried to surplus	$2,783,950	$3,840,670

FRANKFORT & CINCINNATI.—*Reorganization.*—The Interstate Commerce Commission has issued a certificate authorizing the Frankfort & Cincinnati Railroad Company to acquire the line of the former Frankfort & Cincinnati Railway Company extending from Frankfort, Ky., to Paris, 40.8 miles, which was sold under foreclosure on January 31, 1927. The commission has also granted authority for the issuance of $20,000 of common stock and $20,000 of preferred consisting of 4,000 shares of a par value of $10 each. The common stock is to be issued in payment of the property to be acquired. The preferred to be sold for cash at not less than par and the proceeds are to be used for rehabilitation and for additions and betterments. The preferred stock will be entitled to receive a maximum dividend of 6 per cent and will not be cumulative.

ILLINOIS TERMINAL RAILROAD.—*Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,005,000 of common stock and $5,000,000 of 6 per cent preferred stock, stating that it desires to use $1,000,000 of the proceeds for the construction or acquisition of an extension of the line of the Illinois Terminal Company between Formosa and Belleville, Ill., and $5,000,000 for the discharge of obligations created and to be incurred upon approval of a lease of the property of the Illinois Terminal Company, for which a separate application was to be filed.

LEHIGH & NEW ENGLAND.—*Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $750,000 of general mortgage gold bonds to be sold at not less than 102.

MISSOURI-ILLINOIS.—*Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,000,000 of addition capital stock, to reimburse its treasury for expenditures from income, to existing stockholders in proportion to their holdings.

MISSISSIPPI EXPORT RAILROAD.—*Securities.*—This company, which was in 1923 authorized to operate a line from Pascagoula, Miss., to Evanston, 42 miles, a part of the former Alabama & Mississippi, has been authorized by the Interstate Commerce Commission to issue $74,000 of capital stock, $75,000 of promissory notes and $100,000 of first mortgage 6 per cent bonds as collateral for the notes.

MISSOURI PACIFIC.—*Tentative Valuation.*—The Interstate Commerce Commission on May 18 made public its tentative valuation report, finding the final value for rate-making purposes as of 1918 to be $238,048,297 for the carrier property owned and $250,293,366 for that used including $13,243,366 for leased lines. The outstanding capitalization as of valuation date was $381,299,220, and the book investment in road and equipment was $351,088,465. With readjustments required by the accounting examination this would be reduced to $337,922,704, the report says. The cost of reproduction new of the owned property, exclusive of land, was placed at $259,500,031, and the cost of reproduction less depreciation at $194,627,352. The cost of reproduction new of the used property was placed at $271,017,807 and the cost of reproduction less depreciation at $203,499,053. Carrier lands, 90,136 acres, were assigned a present value of $28,544,125. The company also owned $80,466,052 par value of securities of and other investments in other companies, classified as held for non-carrier purposes, and recorded at a book value of $31,072,356.

NORTHERN PACIFIC.—*Valuation Hearings.*—The Interstate Commerce Commission has postponed from June 13 to August 10 the hearing on the tentative valuation of the property of this company and subsidiaries, before Examiner Folsom.

(*Continued on page* 1552)

Annual Reports

The New York Central Railroad Company

To the Stockholders of
THE NEW YORK CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1926, with statements showing the income account and the financial condition of the company.

The year's business

The company's net income for the year, $55,664,040.98, was the largest in its history, exceeding that for 1925, the highest previous year, by $7,036,817.41. Total operating revenues, $399,537,748.86, exceeded 1925 by $13,543,244.06, but were $21,497,035.05 less than in 1923, the record year for such revenues.

Income Account for the Year

INCLUDING BOSTON AND ALBANY RAILROAD AND THE OHIO CENTRAL LINES

	Year ended Dec. 31, 1926	Year ended Dec. 31, 1925	Increase or Decrease
OPERATING INCOME	6,928.09 *miles operated*	6,930.60 *miles operated*	—2.51 *miles*
RAILWAY OPERATIONS			
Railway operating revenues	$399,537,748.86	$385,994,504.80	$13,543,244.06
Railway operating expenses	298,931,037.51	290,440,958.36	8,490,079.15
NET REVENUE FROM RAILWAY OPERATIONS	$100,606,711.35	$95,553,546.44	$5,053,164.91
Percentage of expenses to revenues	(74.82)	(75.24)	—(.42)
Railway tax accruals	$26,881,808.16	$25,343,923.06	$1,537,885.10
Uncollectible railway revenues	167,079.84	217,275.70	—50,195.86
RAILWAY OPERATING INCOME	$73,557,823.35	$69,992,347.68	$3,565,475.67
Equipment rents, net debit	$4,693,332.90	$5,079,852.17	—$386,519.27
Joint facility rents, net credit	3,294,001.85	3,008,054.29	285,947.56
NET RAILWAY OPERATING INCOME	$72,158,492.30	$67,920,549.80	$4,237,942.50
MISCELLANEOUS OPERATIONS			
Revenues	$813,799.30	$973,831.25	—$160,031.95
Expenses and taxes	791,523.79	883,456.30	—91,932.51
MISCELLANEOUS OPERATING INCOME	$22,275.51	$90,374.95	—$68,099.44
TOTAL OPERATING INCOME	$72,180,767.81	$68,010,924.75	$4,169,843.06
NON-OPERATING INCOME			
Income from lease of road	$115,047.46	$116,288.84	—$1,241.38
Miscellaneous rent income	3,158,978.52	2,704,564.40	454,414.12
Miscellaneous non-operating physical property	526,187.65	550,109.64	—23,921.99
Separately operated properties—profit	1,229,921.14	1,148,287.87	81,633.27
Dividend income	18,224,254.89	15,318,324.68	2,905,930.21
Income from funded securities and accounts	3,185,453.76	3,215,800.83	—30,347.07
Income from unfunded securities and accounts	2,380,356.19	2,137,074.43	243,281.76
Income from sinking and other reserve funds	150,669.85	130,599.21	20,070.64
Miscellaneous income	105,820.56	98,045.40	7,775.16
TOTAL NON-OPERATING INCOME	$29,076,690.02	$25,419,095.30	$3,657,594.72
GROSS INCOME	$101,257,457.83	$93,430,020.05	$7,827,437.78
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads	$14,340,187.51	$14,079,484.88	$260,702.63
Miscellaneous rents	891,107.36	886,011.84	5,095.52
Miscellaneous tax accruals	235,189.54	202,302.93	32,886.61
Separately operated properties—loss	11,271.25	14,701.21	—3,429.96
Interest on funded debt	29,268,397.17	28,684,284.15	584,113.02
Interest on unfunded debt	67,025.88	142,209.50	—75,183.62
Amortization of discount on funded debt	525,267.95	550,075.45	—24,807.50
Maintenance of investment organization	5,665.29	5,471.58	193.71
Miscellaneous income charges	249,304.90	238,254.94	11,049.96
TOTAL DEDUCTIONS FROM GROSS INCOME	$45,593,416.85	$44,802,796.48	$790,620.37
NET INCOME	$55,664,040.98	$48,627,223.57	$7,036,817.41
DISPOSITION OF NET INCOME			
Dividends declared (7 per cent each year)	$26,827,814.64	$26,732,833.39	$94,981.25
Sinking and other reserve funds	145,179.41	125,465.17	19,714.24
Investment in physical property	.....	652.47	—652.47
TOTAL APPROPRIATIONS OF INCOME	$26,972,994.05	$26,858,951.03	$114,043.02
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS	$28,691,046.93	$21,768,272.54	$6,922,774.39

Profit and Loss account

BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1925		$157,776,948.80
ADDITIONS:		
Surplus for the year 1926	$28,691,046.93	
Profit on property sold	181,289.17	
Profit on securities sold or matured	716,330.81	
Sundry adjustments (net), unrefundable overcharges and uncollectible accounts	178,792.86	29,767,459.77
		$187,544,408.57
DEDUCTIONS:		
Surplus appropriated for investment in physical property	$125,735.67	
Depreciation prior to July 1, 1907, on equipment retired during year	621,132.04	
Loss on property retired	1,357,974.01	2,104,841.72
BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1926		$185,439,566.85

Revenues, tonnage and passengers

Freight revenue was $248,365,453.08, an increase of $8,250,106.23, the tons of revenue freight moved during the year being 117,786,158 tons, an increase over 1925 of 6,562,460 tons. The commodities which principally contributed to this increase were coal, coke and iron ore. The movement of anthracite coal increased 1,070,959 tons, the traffic having been sub-normal in 1925 because of the strike in the latter part of that year. The increase of 4,184,314 tons in bituminous coal resulted from greater industrial activity and from the increased demand for export coal incident to the British strike. The use of coke as a substitute for anthracite coal in the early part of the year as a result of the strike in the anthracite industry caused an increase of 395,973 tons in the coke traffic. The movement of iron ore increased 890,832 tons as the result of greater demand by the steel industry. Coal and coke constituted 43.81 per cent of the total tonnage in 1926.

Passenger revenue was $99,913,735.41, an increase of $3,154,068.91 over 1925 and of $1,243,538.45 over 1923, the previous record year. Revenue passengers carried were 71,177,121, an increase over 1925 of 2,007,181. Interline passengers increased 38,261, local passengers 136,119, and commutation passengers 1,832,801. The increase in local passenger traffic is worthy of note since there had been decreases therein each previous year since 1921. The increase in communication passengers is due to the development of suburban territory adjacent to large cities on the company's lines.

Mail revenue decreased $151,541.87, largely the result of a falling off in traffic and the Government's policy of taking over terminal service theretofore performed by the company.

Express revenue increased $432,502.51 due to a larger volume of business.

Incidental and joint facility revenues increased $1,403,219.72, a substantial part of which was the result of larger receipts from ore handling at docks at Ashtabula, Buffalo and Toledo.

Operating expenses were as follows:

Operating expenses

Group	Amount	Increase
Maintenance of way and structures	$53,904,855.95	$1,120,865.61
Maintenance of equipment	84,187,013.64	2,968,248.34
Traffic expenses	4,952,455.45	372,054.30
Transportation expenses	135,850,197.66	1,575,942.01
Miscellaneous operations	5,771,802.85	541,190.14
General expenses	14,550,634.10	1,994,075.73
Transportation for investment—credit	285,922.14	* 82,296.98
Total	$298,931,037.51	$8,490,079.15

* Decrease.

Expense for maintenance of way and structures increased $1,120,865.61. This increase was well distributed among the items embraced in this group, but there may be specifically mentioned a somewhat larger outlay for track work, including ballasting but excluding ties in the replacement of which there was a substantial decrease. Severer weather conditions resulted in an increased expenditure of over $500,000 for snow removal.

Expense for maintenance of equipment increased $2,968,248.34. Repairs to all classes of equipment, with the exception of freight cars, increased in the aggregate $2,260,335.66. Larger units and the installation of modern devices, together with more intensive use, account for the increase in locomotive repairs, while the greater number of passenger-train cars overhauled in 1926 and the lengthening of 49 multiple unit cars resulted in an increased outlay for passenger car repairs. Freight car repairs decreased $1,308,578.60, the number of units of this class requiring general

[ADVERTISEMENT]

reconditioning having been substantially less than in 1925. Charges for depreciation of equipment increased $780,166.86, due to the acquisition of additional units, and for retirements increased $934,455.80.

Traffic expenses increased $372,054.30, incident in part to an enlargement of the company's advertising program.

Transportation expenses, other than those covering loss and damage to freight and injuries to persons, increased $4,219,478.79 due to the increased traffic in 1926 and to advances in wages. Decreases in charges for loss and damage to freight and for injuries to persons aggregated $2,643,536.78 largely due to the adjustment of accruals in the reserves set up for prior years.

Expense of miscellaneous operations increased $541,190.14 due principally to greater charges in connection with the dining car service following the larger passenger business.

General expenses increased $1,994,075.73, the principal item contributing thereto being pensions; the reserve for payments to employees retired in 1926 having been substantially greater than that set up to cover those pensioned in 1925.

Operating and transportation ratios

The ratios of operating and of transportation expenses to operating revenues during the last five years are as follows:

Year	Operating expenses per cent	Transportation expenses per cent
1922	79.88	37.79
1923	77.41	35.39
1924	75.75	36.46
1925	75.24	34.79
1926	74.82	34.00

Railway tax accruals

Railway tax accruals were $26,881,808.16, an increase of $1,537,885.10, divided as follows:

Federal	$6,183,605.31	Increase	$271,715.61
State (including county, municipal, etc.)	20,683,506.43	Increase	1,262,580.87
Canadian	14,696.42	Increase	3,588.62

The increase in federal taxes is the result of an additional accrual of $600,000 for income taxes, partly offset by a decrease in federal capital stock taxes of approximately $328,000. The increase in state taxes is largely accounted for by acquisition of additional properties and by increased assessments, in some cases, upon real estate previously held.

Non-operating income

Micellaneous rent income increased $454,414.12, largely due to rentals for new properties in the Grand Central Terminal zone and additional rent under a number of existing leases.

Profit from separately operated properties increased $81,633.27 as the result of the larger amount received account of operation of the Pittsburgh, McKeesport and Youghiogheny Railroad.

Dividend income increased $2,905,930.21. Dividends of 7 per cent in 1926 on stock of The Cleveland Cincinnati Chicago and St. Louis Railway Company as compared with 5½ per cent in 1925 resulted in an increase of $644,116.50. Increased holdings of capital stock of The Michigan Central Railroad Company and increased dividend rates yielded $1,577,647.50 more income thereon.

There was also additional dividend income from the company's holdings of stock in the Reading Company, Mohawk Valley Company and sundry other companies.

Income from funded securities and accounts decreased $30,347.07 due to the sale of investment securities during the year.

Income from unfunded securities and accounts increased $243,281.76, the result of interest on larger bank balances and upon additional loans and advances.

Deductions from gross income

Rent for leased roads increased $260,702.63. This is accounted for by interest on additional advances for construction work upon the Hudson River Connecting Railroad and by larger rental payments to The Mahoning Coal Railroad Company, these being partly offset by a decrease in rental payments in connection with the company's Ohio Central Lines leases, resulting from a reduction in equipment trust obligations outstanding.

Interest on funded debt increased $584,113.02. An increase of $755,325 in such interest was caused by a credit of that amount to the 1925 account reflecting a cancellation of a like amount of interest accrued in 1924 upon convertible debentures which were converted into capital stock prior to May 1, 1925. As a partial offset there was a decrease of $171,172.36 resulting from retirement of equipment trust certificates.

Net income before dividends and other appropriations

The net income of the company was $55,664,040.98, an increase of $7,036,817.41, and amounted to 14.52 per cent upon the capital stock outstanding at the end of the year.

Dividends

Date declared	Date payable	Rate per cent	Amount
March 10, 1926	May 1, 1926	1¾	$6,706,953.66
June 9, 1926	August 2, 1926	1¾	6,706,953.66
September 15, 1926	November 1, 1926	1¾	6,706,953.66
December 15, 1926	February 1, 1927	1¾	6,706,953.66
Total for year, 7 per cent			$26,827,814.64

Surplus

After charges for dividends aggregating $26,827,814.64 and other appropriations amounting to $145,179.41, there remained a surplus for the year of $28,691,046.93 which was carried to the credit of profit and loss. At the end of the year the total corporate surplus was $187,821,081.01.

Property investment accounts

The increases in the property investment accounts for the year, shown in detail elsewhere in this report, were:

Road	$12,007,315.52
Equipment	24,342,913.36
Miscellaneous physical property	1,115,010.40
Improvements on leased railway property	11,317,251.54
A total of	$48,782,490.82

Proposed increase in authorized amount of the company's capital stock

Pursuant to resolutions adopted by the Board of Directors on June 9, 1926, for an increase in the authorized capital stock of the company from $400,000,000, par value, to $500,000,000, par value, the stockholders at a special meeting held on September 29, 1926, authorized such stock increase and the issue of the proposed additional stock from time to time for the capital purposes of the company in such amounts and upon such terms as the Board of Directors may determine and as may be authorized by law. The increase will be effective when the necessary certificates relating thereto shall have been filed in the several states of incorporation.

Stockholders

The following table shows the growth in the number of stockholders from 1915:

Date	Total		In United States		Abroad	
	Number	Average holding	Number	Average holding	Number	Average holding
December 31, 1915	25,042	100	22,270	104	2,772	64
December 31, 1916	22,532	111	21,836	112	696	56
December 31, 1917	27,102	92	26,771	92½	331	69
December 31, 1918	28,693	87	28,395	87	298	69
December 31, 1919	30,445	82	30,180	82	265	67
December 31, 1920	32,396	77	32,173	77	223	64
December 31, 1921	34,328	73	33,824	73	504	70
December 31, 1922	34,319	78	33,843	78	476	70
December 31, 1923	34,946	77	34,502	77	444	70
December 31, 1924	36,282	84	35,856	84	426	66
December 31, 1925	40,660	94	40,238	94½	422	64
December 31, 1926	61,580	62	61,174	62	406	69

The increase in the number of stockholders during the year is largely due to the issue of stock to employees upon completion of payments upon their stock subscriptions made under the company's 1925 offerings.

200,000 shares of unissued stock made available for issue upon subscriptions by employees

In order that capital stock of the company may be made available for further offerings for subscription by employees of the company and of its controlled companies, the Board of Directors, by resolution adopted June 9, 1926, recommended that the stockholders consent (in accordance with the authorization of the statutes of the several states in which the company is incorporated) to the issue by the company from time to time of not exceeding 200,000 shares of its authorized but unissued stock, upon subscriptions therefor by such employees, under such plan, at such price or prices (not less than par value) and upon such terms and conditions as the Board may from time to time determine. Such consent was given by the stockholders at the special meeting held on September 29, 1926.

Changes in funded debt

The changes in the funded debt of the company, in detail, were as follows:

The amount on December 31, 1925	$696,501,507.48
has been increased as follows:	
N Y C Lines Equipment Trust 4½ per cent certificates of May 15, 1925	6,776,000.00
	$703,277,507.48
and has been reduced as follows:	

[Advertisement]

New York & Northern Railroad Co. first mortgage 5 per cent bonds due October 1, 1927, purchased and cancelled	$15,000.00	
Payments falling due during the year and on January 1, 1927, on the company's liability for principal installments under equipment trust agreements as follows:		
M D T Co Trust of 1911, July 1, 1926	75,000.00	
N Y C Lines Trust of 1912, January 1, 1927	688,398.90	
N Y C and H R R R Co (Boston and Albany) Trust of 1912, October 1, 1926	500,000.00	
N Y C Lines Trust of 1913, January 1, 1927	742,117.61	
N Y C R R Co Trust of 1917, January 1, 1927	1,117,000.00	
Trust No. 43 of January 15, 1920, January 15, 1926	922,700.00	
N Y C R R Co Trust of 1920, April 15, 1926	1,153,167.33	
N Y C Lines Trust of 1922, June 1, 1926	572,000.00	
N Y C Lines 4½ per cent Trust of 1922, September 1, 1926	569,000.00	
N Y C Lines Trust of June 1, 1923, June 1, 1926	462,000.00	
N Y C Lines Trust of 1924, June 1, 1926	983,000.00	
N Y C Lines 4½ per cent Trust of 1924, September 15, 1926	848,000.00	
N Y C Lines Trust of 1925, May 15, 1926	250,000.00	8,897,383.84
leaving the funded debt on December 31, 1926 a net decrease of $2,121,383.84.		$694,380,123.64

West Side Improvements—New York City and electrification in New York and adjoining cities

While the court proceeding, referred to in the annual report for 1925, to restrain the enforcement of the Acts of 1923 and 1924 prohibiting the operation of any railroad within Greater New York and adjoining cities after January 1, 1926, with any motive power other than electricity was pending the Acts in question were amended so as to authorize the Public Service Commission to extend the time limit for a period not exceeding five years from that date, upon good cause shown. Accordingly, upon application by this Company, the Commission extended the time limit as to the several parts of the road involved to various dates. The work of electrification has been proceeding except where elimination of grade crossings is involved.

There was also passed at the session of the Legislature in 1926, Chapter 510 of the laws of 1926, which provided for the elimination of grade crossings within the Greater City of New York.

In accordance with conferences had with the state and municipal officers a committee of engineers was appointed on July 1, 1926, representing this company and various public bodies having authority or interest in the grade crossing eliminations, or the improvements to be made in connection therewith, to consider the physical features of a proper west side plan which would bring about the elimination of grade crossings, enable the improvements desired by the company to be made, and at the same time make provisions for such improvements as the City might wish to make.

This committee has had frequent meetings since its appointment and progress has been made. On this engineering committee, in addition to this company, the Transit Commission, the City of New York, the Board of Transportation and the Port of New York Authority is each represented.

In connection with these improvements the electrification of the Yonkers Branch of the Putnam Division, comprising the line from Sedgwick Avenue, New York City, to Getty Square, Yonkers, was completed and placed in service. Elimination of grade crossings and construction of a new freight station at Manhattanville and the grade elimination at Dyckman Street, New York City, which were commenced in 1925, progressed during the year. Other electrification work of a general nature was commenced during the year and is being executed as rapidly as possible.

Automatic train control

In compliance with orders of the Interstate Commerce Commission, referred to in the annual report of 1925, the installations of automatic train control devices upon the Mohawk division between Albany and Syracuse, upon the Erie division between Buffalo and Cleveland and upon the Boston and Albany Railroad between Boston and Albany were completed and put into service on July 18, 1926.

These installations involved equipping 822 New York Central locomotives and 242 Boston and Albany locomotives with automatic train control devices.

The mileage equipped was, upon the New York Central, 325.76 road miles and 1,253.51 track miles; upon the Boston and Albany 198.8 road miles and 485.7 track miles.

Container car service

Satisfactory progress in this special service has been made. The use of merchandise containers has developed from 5 cars with 30 containers in 1922 to 33 cars with 198 containers in 1926. Brick containers have increased from 1 car with 12 containers in 1923 to 198 cars with 2,376 containers in 1926, with additional units under order for future delivery.

Construction of new office building on Park Avenue, north of Grand Central Terminal, New York City

Work was commenced on the foundations of the new office building, referred to in the annual report for 1925, which is to span Park Avenue between Vanderbilt Avenue on the west and Depew Place on the east from 45th to 46th street. The main structure will be 15 stories high surmounted by a tower rising 19 stories. The building will contain approximately 800,000 square feet of rentable office space.

New station at Buffalo

Following consummation of an agreement with the City of Buffalo, as reported last year, work has commenced on the construction of a new station at Curtiss and Lovejoy streets (a location satisfactory from both the standpoint of the City and this company), to furnish station facilities for the City of Buffalo directly on the through main line. The new station will be known as the Central Terminal. The plans for the new station building contemplate a structure of steel frame faced with brick. The station building proper will be six stories high with a twelve-story tower surmounting the main entrance and facing Lovejoy Street and the plaza. During the year substantial progress was made in the acquisition of land and on track work, street changes, construction of new streets, including a station plaza, on a new subway at William Street, the Howard Street team yard, and platform extensions for the Curtiss Street express facilities.

Negotiations are progressing with the City of Buffalo for a downtown station in the vicinity of Main and Washington Streets and for the removal of the existing tracks from the surface of the Terrace and Church Street by relocation of the company's roadway in the abandoned Erie Canal bed.

Straightening of South Branch of Chicago River and reclamation of land—Chicago

Negotiations which had extended over a considerable period were successfully consummated during the year through the acceptance by the several so-called South Side Railroads, including this company, of an ordinance providing for the straightening of the South Branch of the Chicago River between Polk Street and 18th Street, a distance of about 5,000 feet, which involves substantial land transfers from the west side of the river to the east side of the new river channel and reclamation of lands from the old river bed. The straightening of the river will permit the construction of new north and south street thoroughfares required by the City and will produce additional property upon which the railroads east of the river, including this company, may extend their passenger and freight terminal facilities. Under the provisions of the ordinance, this company will acquire jointly with the Chicago Rock Island and Pacific Railway Company about 440,000 square feet of land adjoining their present joint holdings between 12th and 16th streets. The cost of straightening the river is to be paid by the City.

Centennial ceremonies

The Mohawk and Hudson Railroad Company, the parent line of the present New York Central Lines, was granted a charter by the legislature of the State of New York by special act approved April 17, 1826. The centennial of the procurement of the charter of this company was celebrated on April 17 with appropriate ceremonies, which included the placing of memorial bronze tablets upon the stations at Albany and Schnectady, these two cities being the terminal points of the original railroad. A photograph of one of these tablets accompanies this report.

Changes in organization

The Board records with deep regret the death of George A. Harwood, Vice President, on November 4, 1926.

The Board records the following appointments:

Frank H. Hardin, Assistant to President, January 1, 1926;

Richard E. Dougherty, Engineering Assistant to President, November 10, 1926;

Albert S. Ingalls, Assistant Vice President, March 1, 1926;

William J. Fripp, Assistant Vice President, effective January 1, 1927, succeeding Timothy W. Evans, who became Vice President of Indiana Harbor Belt Railroad Company and of The Chicago River and Indiana Railroad Company on the same date.

The Board wishes to express its appreciation of the loyal and efficient service of the officers and employees of the company during the year.

For the Board of Directors,

P. E. Crowley,
President

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Colorado & Southern Ry. Co.—Twenty-Eighth Annual Report

CHICAGO, January 3, 1927.

TO THE STOCKHOLDERS OF THE COLORADO AND SOUTHERN RAILWAY COMPANY:

Herewith is submitted the Twenty-Eighth Annual Report of your Board of Directors for the year ended December 31, 1926, setting forth composite income statement and statistics of operation for Colorado and Southern Lines included in this report. Balance sheets, income account and other statements of the several companies comprising the Colorado and Southern Lines are shown separately in the report of the Comptroller.

Comparative Statement of Income, Years Ended December 31

Per Cent of Ry. Oper. Rev.	1926	Railway Operating Revenues	1925	Per Cent of Ry. Oper. Rev.
76.81	$21,639,916.76	Freight	$19,598,517.62	76.40
15.93	4,487,367.77	Passenger	4,140,562.10	16.14
1.46	411,062.86	Mail	408,040.43	1.59
1.93	544,730.50	Express	510,614.49	1.99
2.27	638,890.93	All other transportation	579,358.62	2.26
1.30	366,210.70	Incidental	347,178.90	1.35
.30	84,627.05	Joint facility	69,882.59	.27
100.00	$28,172,806.57	Total railway operating revenues	$25,654,154.75	100.00
		Railway Operating Expenses		
11.41	$3,214,624.37	Maintenance of way and structures	$2,888,666.33	11.26
18.30	5,155,101.17	Maintenance of equipment	4,934,682.89	19.23
1.37	385,437.29	Traffic	348,603.41	1.36
32.10	9,043,522.49	Transportation	8,461,550.13	32.98
.74	208,408.42	Miscellaneous operations	203,688.94	.79
3.53	995,869.32	General	958,266.44	3.74
Cr..10	29,642.88	Transportation for investment—Cr.	44,829.91	Cr..17
67.35	$18,973,320.18	Total railway operating expenses	$17,750,628.23	69.19
32.65	$9,199,486.39	Net revenue from railway operations	$7,903,526.52	30.81
.....	$1,750,816.72	Railway tax accruals	$1,637,702.52	.....
.....	8,595.90	Uncollectible railway revenue	6,992.52	.....
.....	$7,440,073.77	Railway operating income	$6,258,831.48	.....
.....	Dr. 559,933.78	Hire of equipment—Net	Dr. 531,424.85	.....
.....	Dr. 179,060.95	Joint facility rents—Net	Dr. 65,923.55	.....
.....	$6,701,079.04	Net railway operating income	$5,661,483.08	.....
		Other Non-Operating Income		
.....	$99,111.00	Miscellaneous rent income	$95,260.94	.....
.....	640,386.34	Dividends and miscellaneous interest	596,011.96	.....
.....	1,821.39	Miscellaneous income	2,945.87	.....
.....	$741,318.73	Total other non-operating income	$694,218.77	.....
.....	$7,442,397.77	Gross income	$6,355,701.85	.....
		Other Deductions from Gross Income		
.....	$3,692.80	Miscellaneous rents	$7,121.02	.....
.....	2,460,138.81	Interest on funded debt	2,551,365.45	.....
.....	9,905.03	Interest on unfunded debt	7,859.66	.....
.....	31,756.42	Amortization of discount on funded debt	32,157.44	.....
.....	88,867.68	Miscellaneous income charges	91,259.22	.....
.....	$2,594,360.74	Total other deductions from gross income	$2,689,762.79	.....
.....	$4,848,037.03	Net income	$3,665,939.06	.....
		Disposition of Net Income		
.....	$1,610,299.04	Dividends	$680,311.04	.....
.....	$1,610,299.04	Total appropriations of income	$680,311.04	.....
.....	$3,237,737.99	Income balance	$2,985,628.02	.....

General Operations

Revenues:

Total Operating Revenues for 1926	$28,172,806.57	
Total Operating Revenues for 1925	25,654,154.75	
Increase	$2,518,651.82	9.82%

This increase is made up as follows:

Freight	Increased	$2,041,399.14	10.42%
Passenger	Increased	346,805.67	8.38%
Mail	Increased	3,022.43	.74%
Express	Increased	34,116.01	6.68%
Switching	Increased	33,703.17	7.65%
Other Transportation revenues	Increased	25,829.14	18.62%
Incidental Operating revenues	Increased	33,776.26	8.10%
Net increase		$2,518,651.82	9.82%

A comparison of tonnage by commodities with 1925 shows a net increase as follows:

Products of Agriculture	Increased	354,433 tons	29.39%
Animals and Products	Decreased	41,542 tons	14.85%
Products of Mines	Increased	629,827 tons	16.05%
Products of Forests	Increased	46,461 tons	11.79%
Manufactures and Miscellaneous	Decreased	14,234 tons	.66%
Less-than-carload tonnage	Increased	7,411 tons	4.84%
Total tonnage	Increased	982,356 tons	12.09%

A comparison of carloads shows:

Total Cars (all commodities) in 1926	279,950 cars	
Total Cars (all commodities) in 1925	261,010 cars	
Increase in 1926	18,940 cars	7.26%

There was a substantial increase in freight revenue during the year, due principally to increased tonnage handled owing to improved agricultural and other conditions, also operation into Dallas, Texas, for the full year, such operation having been begun on June 1, 1925. The increase in carloads of wheat handled was 146.59%; and in carloads of all grain, 40.87%; and in carloads of all other products of agriculture, 6.07%.

The substantial decrease in Animals and Products is due to decrease of 15.05% in the number of carloads handled of horses, mules, cattle, sheep and hogs. The decline in the movement of cattle is due principally to favorable pasturage conditions in Texas, relieving the necessity of shipping to the northern pastures. Due to higher prices of lambs, the number of head fed in feed lots was greatly reduced. There was less demand for horses and mules at Texas and Mexican points.

The increase in Products of Mines was due to an increase of 176.91% in carloads of crude petroleum, 41.14% in carloads of clay, gravel, sand and stone, and 29.89% in carloads of iron ore. The movement of bituminous coal was about the same as in the previous year.

Due principally to increased building activity and oil field development, there was an increase in the number of carloads handled of lumber, timber, etc., of 12.27%.

Less-than-carload tonnage handled produced an increase in revenue, the tonnage handled showing an increase of 4.84%.

Operating Statistics:

Tons of revenue freight carried—1926	9,105,152	
Tons of revenue freight carried—1925	8,122,796	
Increase	982,356	12.09%
Revenue tons one mile—1926	1,632,849,480	
Revenue tons one mile—1925	1,426,517,730	
Increase	206,331,750	14.46%
Revenue tons per train mile—1926	552.33	
Revenue tons per train mile—1925	532.03	
Increase	20.30	3.82%
Revenue tons per loaded car—1926	25.14	
Revenue tons per loaded car—1925	24.29	
Increase	.85	3.50%
Revenue passengers carried—1926	960,293	
Revenue passengers carried—1925	977,005	
Decrease	16,712	1.71%
Revenue passengers carried one mile—1926	133,310,874	
Revenue passengers carried one mile—1925	122,321,143	
Increase	10,989,731	8.98%
Average distance carried—revenue passengers—1926	138.82	
Average distance carried—revenue passengers—1925	116.37	
Increase	22.45	19.29%

Expenditures (Operating):

Total operating expenses—1926	$18,973,320.18	
Total operating expenses—1925	17,750,628.23	
Increase	$1,222,691.95	6.89%

The increase in operating expenses is due to increase in business handled, also to a heavier track and equipment maintenance program during the year than in the previous year. Also, there was an increase in wages of shopcraft employes, effective November 1, 1926. The operating ratio was 67.35%, compared with 69.19% in 1925 and 68.49% in 1924.

Expenditures for Maintenance of Way increased $325,958, or 11.29%, due principally to tie renewals, rail renewal, other track material and track laying and surfacing.

Expenditures for Maintenance of Equipment increased $220,418, or 4.47%, due to steam locomotive repairs and freight, passenger and work equipment repairs.

Traffic expenditures increased $36,834, or 10.56%, due to increased forces and advertising.

Transportation Expenses increased $581,972, or 6.88%, account increased business handled and increased cost of fuel.

By order of the Board of Directors.

HALE HOLDEN,
President.

[ADVERTISEMENT]

Railway Finance

(*Continued from page* 1547)

NORWICH & WORCESTER.—*Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $1,800,000 of first mortgage 4½ per cent gold bonds, to be sold at not less than 97.78.

PENNSYLVANIA.—*Valuation Hearings.*—The Interstate Commerce Commission has postponed from May 16 to June 1 the hearings on the tentative valuation reports on the Pennsylvania and 26 subsidiary properties, before Examiners Gibson and Woodrow.

PERE MARQUETTE.—*New Director.*—E. M. Heberd, secretary of the Pere Marquette, has been elected a director to fill the only existing vacancy on the board.

ST. LOUIS SOUTHWESTERN.—*Minority Stockholder Appeals to Court.*—Walter E. Meyer, representing the minority stockholders of the St. Louis Southwestern, who was rejected as a director at the annual meeting, filed a petition in the Circuit Court at St. Louis on May 16 asking that the court declare him a director or order a new election held.

Injunction Refused.—The Circuit Court at St. Louis has refused Walter E. Meyer a preliminary injunction against the St. Louis Southwestern to prevent a directors' meeting, and has set May 27 for a hearing on Mr. Meyer's objection to his removal from the board of directors.

TEXAS & PACIFIC.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Pecos Valley Southern by the purchase of its capital stock of $45,000 and its first mortgage bond issue of $400,000 for $192,000 in cash. The company's line extends from Pecos to Toyahvale, Tex., 46 miles.

TUSKEGEE.—*Securities.*—The Interstate Commerce Commission has authorized this company to issue $100,000 bonds or notes.

Average Price of Stocks and Bonds

	May 17	Last week	Last year
Average price of 20 representative railway stocks.	112.08	112.50	88.95
Average price of 20 representative railway bonds.	94.70	94.97	91.46

Dividends Declared

Alabama Great Southern.—Common, 3½ per cent, semi-annually; common, 3 per cent, extra, both payable June 28 to holders of record May 24. Preferred 3½ per cent, semi-annually; preferred, 3 per cent, extra, both payable August 15 to holders of record July 11.

American Railway Express.—$1.50, quarterly, payable June 30 to holders of record June 15.

Chestnut Hill.—1½ per cent, quarterly, payable June 4 to holders of record May 20.

Chicago, Rock Island & Pacific.—Common, 1¼ per cent, quarterly; seven percent preferred, 3½ per cent, semi-annually; six per cent preferred, 3 per cent, semi-annually, all payable June 30 to holders of record June 3.

Cincinnati, New Orleans & Texas Pacific.—Preferred, $1.25, quarterly, payable June 1 to holders of record May 13.

Cleveland & Pittsburgh.—Guaranteed $0.87½, quarterly; special guaranteed, $0.50, quarterly, both payable June 1 to holders of record May 10.

Pittsburgh, Bessemer & Lake Erie.—Preferred, $1.50, payable June 1 to holders of record May 14.

Pittsburgh, Youngstown & Ashtabula.—Preferred 1¾ per cent, quarterly, payable June 1 to holders of record May 20.

Southern Pacific Company.—1½ per cent, quarterly, payable July 1 to holders of record May 27.

Union Pacific.—Common, 2½ per cent, quarterly, payable July 1 to holders of record June 1.

Railway Officers

Executive

Frank E. Walsh, secretary to the president of the Chicago, Rock Island & Pacific has been appointed as assistant to the president with headquarters at Chicago. Mr. Walsh was born at Chicago on April 10, 1898, and after graduating from St. Patrick's Commercial Academy, Chicago, he entered the service of the Rock Island in April, 1915, as a stenographer in the office of the superintendent at Chicago. Later he

F. E. Walsh

served as trainmaster's clerk on the Chicago Terminal division and in 1918 he was transferred to the president's office as a stenographer. In December of the same year he was advanced to secretary to the federal manager and after the termination of federal control, in September, 1920, he was appointed secretary to the president. Mr. Walsh remained in this position until his promotion to assistant to the president on May 15.

George P. McNear, Jr., general manager of the Toledo, Peoria & Western, with headquarters at Peoria, Ill., has been elected president, with headquarters at the same point, following the discharge of the receivership.

F. H. Porter, vice-president and general manager of the Santa Fe Northwestern, with headquarters at Bernadillo, N. M., has been elected president, with headquarters at the same point, succeeding **G. A. Porter**, deceased.

The Rutland, Toluca & Northern has elected the following as its officers, all with headquarters at Toluca, Ill.: **John R. Cox**, president; **Laura Cox**, secretary and treasurer; **John R. Cox, Jr.**, vice-president and assistant to the general manager. **H. P. Haley** has been appointed auditor and traffic manager, with headquarters at St. Louis, Mo.

T. H. Steffens, vice-president of the Sand Springs, has been elected president, with headquarters at Sand Springs, Okla., succeeding **Charles Page**, deceased, who served as president and treasurer. **F. M. Monsell**, acting treasurer, has been elected vice-president and treasurer, with headquarters at Sand Springs. **E. A. Page** has been elected second vice-president, with headquarters at Sand Springs.

Harry G. Clark, assistant to the president of the Chicago, Rock Island & Pacific, has been elected vice-president, with headquarters at Chicago. Mr. Clark will perform any special duties assigned to him by the president. He will be succeeded as assistant to the president by **Frank E. Walsh**, secretary to the president. Mr. Clark was born on July 8, 1875, at Leavenworth, Kan., and graduated from a course in civil engineering at the University of Kansas in 1898. He gained his first railroad experience as a chairman on the Kansas lines of the Atchison, Topeka & Santa Fe and in 1899 he became a rodman on construction on the Chicago, Burlington & Quincy, later becoming a transitman on location during the work of double tracking across Iowa. Mr. Clark entered the service of the Rock Island in October, 1900, as a resident engineer on the Choctaw, Oklahoma & Gulf, later being advanced to division engineer. Until September, 1905, he served as division engineer on the Pan Handle and Arkansas divisions of the Rock Island and as district engineer of the Choctaw district. He was then transferred to the operating department where he acted as trainmaster on the Arkansas and Oklahoma divisions until June, 1912, when he was promoted to assistant to the vice-president, in charge of maintenance, with headquarters at Chicago. From September, 1918, until June, 1919, Mr. Clark served temporarily as chief engineer and was then appointed assistant to the president, holding the latter position until his election to vice-president on May 1[illegible]

H. G. Clark

Arthur Mackenzie, freight traffic manager of the Chicago, Rock Island & Pacific, has been elected vice-president, with headquarters as at present at Chicago, and with the title of vice-president and freight traffic manager. Mr. Mackenzie was born at Leeds, England, and entered railway service in 1888 as a clerk in the general freight department of the Grand Trunk at Toronto, Ont. Two years later he entered the service of the Michigan Central in a similar capacity, becoming a clerk on the Atchison, Topeka & Santa Fe in 1892. He was appointed tariff clerk in 1894 at Chicago, leaving the Santa Fe in 1896 to become a record clerk in the car service department of the Cleveland, Cincinnati, Chicago & St. Louis. In the same year Mr.

Arthur Mackenzie

Mackenzie was appointed chief clerk to the division freight agent on the Lehigh Valley at Rochester, N. Y. For the next 13 years he held the positions of chief clerk to the general agent of the St. Louis-San Francisco at Chicago, chief clerk to the assistant general freight agent of the Iowa Central (now the Minneapolis & St. Louis), and stenographer, claim clerk, chief rate clerk, assistant chief clerk and chief clerk to the freight traffic manager of the Santa Fe at Chicago. Mr. Mackenzie's service with the Rock Island began in December, 1909, when he was appointed chief clerk to the first vice-president at Chicago. On December 27, 1915, he was promoted to assistant freight traffic manager and in March, 1926, he was further promoted to freight traffic manager, holding the latter position until his election to vice-president and freight traffic manager on May 15.

Financial, Legal and Accounting

F. L. Fox, treasurer for the receiver of the Toledo, Peoria & Western, has been elected treasurer following the discharge of the receivership, with headquarters at Peoria, Ill. **G. A. Gladson** has been elected secretary of the reorganized company, with headquarters at Peoria.

James P. Pratt, assistant regional counsel of the Central region of the Canadian National, with headquarters at Toronto, Ont., has been promoted to regional counsel, succeeding **A. J. Reid**, deceased. **Robert E. Laidlaw**, solicitor in the Central region, with headquarters at Toronto, has been promoted to replace Mr. Pratt.

Guy V. Shoup, general solicitor of the Southern Pacific, with headquarters at San Francsico, Cal., has been placed in charge of the legal department, succeeding **William F. Herrin**, deceased, and the position of chief counsel and vice-president has been abolished. **C. W. Durbrow**, an attorney in the legal department at San Francisco, has been promoted to valuation counsel, with headquarters at the same point.

Robert B. Tunstall, who has been appointed assistant general counsel of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., was born in New York City on February 9, 1880, and was graduated from the University of Virginia in 1899, with the degree of M.A. and in 1902 received his LL.B. He has practiced law in Norfolk, Va., since 1902, and is now a member of the firm of Williams, Loyall & Tunstall. Mr. Tunstall has also been general solicitor in charge of federal valuation for the Virginian.

Operating

R. W. Cattermole, superintendent and chief engineer of the Tonapah & Goldfield, with headquarters at Goldfield, Nev., has been appointed general superintendent, with headquarters at the same point.

J. G. Dennis, assistant trainmaster on the Pittsburgh division of the Pennsylvania, with headquarters at Pitcairn, Pa., has been promoted to freight trainmaster on the Panhandle division, with headquarters at Pittsburgh, Pa.

M. E. Collins has been appointed assistant to the general manager of the Edmonton, Dunvegan & British Columbia, with headquarters at Edmonton, Alta. **J. E. Deakin** has been appointed assistant superintendent, with headquarters at Edmonton. **D. Turner** has been appointed master mechanic, with headquarters at Edmonton.

C. G. Sibley, superintendent of transportation of the Second division of the Atlantic Coast Line, with headquarters at Savannah, Ga., has been appointed general superintendent of the First division, with headquarters at Rocky Mount, N. C., succeeding **W. H. Newell**, retired. **J. A. Wall**, superintendent at Waycross, Ga., has been appointed superintendent of transportation of the Second division at Savannah, Ga. **D. E. McLeod** has been appointed superintendent of the Waycross district, with headquarters at Waycross, Ga., and **E. S. Blackburn** has been appointed trainmaster at the same place. **J. K. Kuyk** has been appointed terminal trainmaster of the Savannah district, with headquarters at Savannah, Ga., and **W. L. Barefoot** has been appointed chief dispatcher at the same place. All appointments are effective June 1.

Traffic

H. T. Rickerson has been appointed general agent, freight department of the New York Central Lines, with headquarters at New Orleans, La., succeeding **A. C. Huggins**, resigned.

Ralph C. Kerr, division freight and passenger agent on the Chicago & North Western at Green Bay, Wis., has been promoted to assistant general freight agent, with headquarters at Chicago.

George Cooley, chief clerk in the baggage department of the Reading, has been appointed general baggage agent, with headquarters at Reading Terminal, succeeding **Harry W. Souders**, deceased.

H. E. Mack, manager of mail traffic of the Texas & Pacific, with headquarters at St. Louis, Mo., has in addition been appointed manager of express traffic with the title of manager of mail and express traffic.

W. H. Thompson, assistant general freight agent of the Missouri Pacific, with headquarters at St. Louis, Mo., has been promoted to general freight agent, with headquarters at the same point. **T. B. Duggan** has been appointed assistant general freight agent, succeeding Mr. Thompson.

Mechanical

E. M. Jenkins, chief draftsman, car department, of the Delaware, Lackawanna & Western, has been appointed master car builder with headquarters at Scranton, Pa., succeeding Peter Alquist, deceased. Mr. Jenkins was born on June 28, 1886, at Vermont, Ill., and was educated in the schools of his native town and the University of Illinois. From July, 1909, to September, 1911, he was special apprentice with the Baldwin Locomotive Works. From the latter date until July 1, 1926, he was successively draftsman with the Baltimore & Ohio; chief draftsman, Seaboard Air Line; mechanical engineer, Virginian; and special mechanical inspector, Chesapeake & Ohio. On July 1, 1926, he became chief draftsman, car department, of the Delaware, Lackawanna & Western.

Engineering, Maintenance of Way and Signaling

Ronald McIsaac has been appointed division engineer of the New Glasgow division of the Atlantic region of the Canadian National, with headquarters at New Glasgow, N. S., succeeding **G. W. H. Perley**, who has been transferred to the Campbellton division, with headquarters at Campbellton, N. B. Mr.

Perley succeeds **L. H. Robinson** who has been transferred to the Halifax division, with headquarters at Halifax, N. S.

William L. Connors, who has been appointed signal engineer of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., was born on August 7, 1883, at Franklinville, N. Y. After attending the public schools and finishing a correspondence course in electrical engineering, Mr. Connors entered railway service on November 15, 1909, as a line maintainer on the B. R. & P. In 1912 he was advanced to general foreman in charge of the installation of dispatching telephone equipment, where he remained until the the following year when he became foreman on the construction of automatic signals. During 1914 he acted as general signal foreman and in March, 1915, he was further advanced to signal supervisor. Mr. Connors was promoted to assistant signal engineer in February, 1916, a position he held until his promotion to signal engineer.

W. L. Connors

Purchases and Stores

A. E. Owen, assistant purchasing agent of the Pennsylvania, with headquarters at Chicago, has been appointed also purchasing agent of the Chicago Union Station Company, Chicago, succeeding **W. G. White, Sr.,** who will continue in his capacity as secretary. Mr. Owen was born on March 27, 1880, at Camden, N. J., and entered railway service in April, 1896, in the office of the auditor of passenger receipts of the Pennsylvania at Philadelphia. In June, 1899, he was transferred to the purchasing department, where he held various positions until 1914, when he was designated to represent the purchasing department with Gibbs and Hill, consulting electrical engineers on the Philadelphia, Paoli and Chestnut Hill electrification. Following this work in 1917, Mr. Owen was appointed chairman of a committee which was placed in charge of the management and the supplying of commisaries of labor camps on the Pennsylvania lines east of Pittsburgh and Buffalo. Two years later he was promoted to equipment agent, becoming assistant to the purchasing agent of the Northwestern region at Chicago in March, 1920. In February, 1924, Mr. Owen was promoted to assistant purchasing agent, the position he held at the time of his further appointment as purchasing agent of the Chicago Union Station Company.

A. E. Owen

Special

E. G. Evans, assistant superintendent of the South & North Alabama, Birmingham Mineral and Alabama Mineral divisions of the Louisville & Nashville, with headquarters at Birmingham, Ala., has been appointed superintendent of safety, with headquarters at Louisville, Ky. **J. E. Brownville** has been appointed assistant superintendent, succeeding Mr. Evans.

Obituary

George Edgar Parks, mechanical engineer of the Michigan Central since June, 1900, died at the Harper Hospital at Detroit, Mich., on May 15, after an illness from peritonitis of one week. Mr. Parks was 56 years old.

Einar A. Johnsen, chief mechanical engineer of the American Gas & Electric Company, died on May 13, of pneumonia at the Post-Graduate Hospital, New York, where he had undergone an operation a week ago. Mr. Johnsen was born in Oslo, Norway, 49 years ago and was graduated from Christiania Engineering College in 1902. After spending three years at Norwegian copper mines he became associated with Alfred Noble, consulting engineer for the Pennsylvania Railroad tunnels under the Hudson and East rivers, New York, and also took part in constructing the foundations for the Hudson Terminal Buildings (Hudson & Manhattan R.R., New York). He then went to Detroit as engineer for the contractors for the Michigan Central tunnels under the Detroit river and later superintended the construction of government wharves in Haiti. In 1915 he entered the service of the American Gas & Electric Company where he remained until his death.

Arthur W. Trenholm, former vice-president of the Chicago, St. Paul, Minneapolis & Omaha who retired from actice service in 1925, died at his home at St. Paul, Minn., on May 13 from a cerebral hemorrhage. Mr. Trenholm was born in Nova Scotia in 1858 and entered railway service in 1869 as a water boy on the Intercolonial (now a part of the Canadian National). Later until 1873 he worked on this railroad as a laborer, then becoming an operator and relief agent on the Grand Trunk. In 1876 Mr. Trenholm returned to the Intercolonial serving successively as a clerk in the accounting department, as a local agent and as a relief agent. His connection with the Omaha began in 1880 when he was appointed as a traveling auditor, remaining in this capacity and as a local agent until January 1, 1893, when he was transferred to the operating department and advanced to division superintendent. In March, 1900, Mr. Trenholm was promoted to general superintendent and from March, 1903, to January, 1918, he was general manager. From May 24, 1916, to January 1, 1918, he also served as vice-president of the Omaha, becoming federal manager during the period of government control. In addition from August 1, 1918, to the end of government control he was federal manager of the Minneapolis Eastern, the Minnesota Transfer, the St. Paul Bridge & Terminal and the Fairchild & Northeastern. On March 1, 1920, he again became vice-president of the Omaha, a position he held until his retirement in November, 1925, after 55 years of railroad service, 45 of which had been with the Omaha.

A. W. Trenholm

THE SOUTHERN RAILWAY announces that the construction of automatic block signals, with automatic train control, on its line from Macon, Ga., southward to Jacksonville, Fla. (including the Georgia Southern & Florida), 262 miles, was completed on May 18, and the system is now in use. With the completion of this work, the Southern has automatic signals and automatic train control throughout its line from Cincinnati, Ohio, to Jacksonville, Fla., 840 miles, the longest continuous installation of automatic train control in the world.